Scanning - Shortwave - Ham Radio - Equipment
Internet Streaming - Computers - Antique Radio

# Monitoring Times

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# WARBIRDS on Display

## Also in this issue:

- Military Operations Areas
- Scanning St. Louis
- GlobalNet: Happy Birthday America!
- MT Reviews: Icom IC-RX7, Tivoli NetWorks Global Radio, MFJ-269 Analyzer

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# SEE More and HEAR More!

## With the SR2000A and AR8200MkIII from AOR


### SR2000A Color Frequency Monitor

*The SR2000A is an ultra-fast spectrum display monitor that lets you SEE received signals in FULL color.*

*Using the power of FFT (Fast Fourier Transform) algorithms with a sensitive receiver covering 25MHz ~ 3GHz*, the SR2000A features a color monitor that displays up to 40MHz spectrum bandwidth**, a switchable time-lapse "waterfall" display or live video in NTSC or PAL formats.*

*Ultra sensitive, incredibly fast, yet easy to use with a high quality internal speaker for crisp, clean audio signals. Scans 10MHz in as little as 0.2 seconds! Instantly detects, captures and displays transmitted signals. PC control through RS232C serial port or USB interface. With 12 VDC input, it's perfect for base, mobile or field use.*


### AR8200MkIII Handheld Receiver

*From inter-agency coordination to surveillance, you can't know too much. The world-class AR8200MkIII portable receiver features a TXCO that delivers solid frequency stability and performance not found in most desktop units. With 1,000 alphanumeric memory channels, it covers 500 KHz ~ 3GHz*. Improved RF circuits combine greater sensitivity, resistance to intermod and enhanced Signal to Noise ratio. It offers increased audio frequency response and includes NiMH AA batteries that can be charged while the unit is in use.*

*Optional internal slot cards expand the AR8200MkIII's capabilities. Choose from Memory Expansion (up to 4,000 memories), CTCSS Squelch and Search, and Tone Eliminator.*

*The AR8200MkIII offers "all mode" reception that includes "super narrow" FM plus wide and narrow FM in addition to USB, LSB, CW and standard AM and FM modes. It also features true carrier reinsertion in USB and LSB modes and includes a 3KHz SSB filter. The data port can be used for computer control, memory configuration and transfer, cloning or tape recording output.*

*A special government version, AR8200MkIII IR features infra-red illumination (IR) of the display and operating keys. The IR illumination function is selectable, allowing operation by users wearing night vision apparatus without removing goggles and waiting for the eyes to re-adjust. Ideal for military, law enforcement and surveillance operators.*

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Authority on Radio Communications

**AOR U.S.A., Inc.**
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Tel: 310-787-8615 Fax: 310-787-8619
info@aorusa.com http://www.aorusa.com

** Government version, cellular blocked for US consumer version.*
***No audio is available when the frequency span is set to 20MHz or 40MHz.*
*Specifications subject to change without notice or obligation.*

***SEE more and HEAR more with AOR, the serious choice in Advanced Technology Receivers™.***

WiNRADiO®

*...the future of radio.™*

# Remarkable Receivers Need Remarkable Antennas!

## AX-81S Ruggedized Active HF Antenna

| | |
|---|---|
| Antenna Type: | Active HF Monopole |
| Frequency Range: | 2-30 MHz |
| Output: IP3: | +30 dBm |
| Operating Temp: | -20 to 80°C |
| Power: | 12V DC @ 40 mA |

## AX-17C Minature Indoor Active HF Antenna

**"It was possible to hear some weak signals on the WiNRADiO antenna that were not audible on ... [a top brand of magnetic loop antenna]."**
**WRTH Review**

| | |
|---|---|
| Antenna Type: | Active Ferrite Antenna |
| Frequency Range: | 0.1-30 MHz |
| Output: IP3: | +30 dBm |
| Operating Temp: | 0 to 50°C |
| Power: | 12V DC @50 mA |

**"As usual with contemporary WiNRADiO products, the AX-17C is very well designed and we have no hesitation in recommending it as a candidate for consideration by those in need of an internal antenna".**
**WRTH Review**

## WR-G313e Software-Defined Shortwave Receiver

| | |
|---|---|
| Type: | Dual Coversion |
| Freq Range: | 9 kHz to 30 (180) MHz |
| Phase Noise: | -148 dBc/Hz @100 kHz |
| Interface: | USB |
| Power: | 12V DC @500 mA |

**"The WiNRADiO G313e is a splendid receiver in all respects, and an excellent example of what can be achieved in a contemporary software-defined radio."**
**WRTH Review**


*Visit* **www.winradio.com** *for more details.*

Monitoring Times

Vol. 28 No. 7 July 2009


## Warbirds on Display

### By Bruce Ames, KE6HPK

Subtitled *A California Vacation,* we focus on taking a vacation to this beautiful state to see some wonderful museums strictly dedicated to warbirds of every era from WW-II to the Gulf War. In many museums you can actually get up close and touch aircraft that saw aerial combat. Whether one takes a vacation in the Northern, Central or Southern part of California, there is a museum for you.

Many of these historic aircraft are located on the grounds of an active airport or air base which also hosts fly-ins or air shows. So we've also provided the frequencies for tuning in these "living" museums today while you're viewing memorable planes of yesteryear.

*On our Cover: The USS Midway aircraft carrier museum in San Diego. Photo by Rachel Baughn.*

C O N T E N T S



## Reviews

The Icom IC-RX7 came as a very pleasant surprise to our reviewer, who admitted he is not a big fan of wideband radios. So what makes the RX7 one of his favorites? Good over-all reception, intuitive functions, useful features, and more; turn to page 68 for details.

Tivoli Audio has built its reputation on high quality performance and simple design, so we were interested to see how this would translate into Tivoli's first internet radio, the NetWorks GlobalRadio. Most promising is that the radio's firmware can be upgraded via the internet, so it should be a fine performer for years to come. (See page 70.)

When working *On the Bench*, good test equipment is often a luxury few can afford. However, Bob Grove puts the MFJ-269 SWR Analyzer through its paces to show it's a lot more than an antenna analyzer. This handy piece of test equipment can be a real bargain for the radio enthusiast who enjoys experimentation and construction. (See page 66.)

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# COMMUNICATIONS

by Ken Reitz

*"Communications" is compiled by Ken Reitz KS4ZR (kenreitz@monitoringtimes.com) from news clippings and links supplied by our readers. Many thanks to this month's fine reporters: Anonymous, David R. Alpert, Rachel Baughn, David G8SZX, Alokesh Gupta, Ira Paul, Larry Van Horn, and George Zeller.*

## SHORTWAVE/AMATEUR RADIO

### HR2160 Seeks to Help Hams

The ARRL reports that a bill introduced by Rep. Sheila Jackson-Lee (D-TX) as HR2160 seeks to help hams and integrate amateur radio with Homeland Security initiatives. Among the issues the bill addresses are, according to the League's web site, to "Identify unreasonable or unnecessary impediments to enhanced Amateur Radio communications – such as the effects of private land use regulations on residential antenna installations – and make recommendations regarding such impediments."

In addition, the bill seeks to modify Section 207 of the Telecommunications Act of 1996 to "prevent unreasonable private land use restrictions that impair the ability of amateurs to conduct or prepare to conduct emergency communications by means of effective outdoor antennas and support structures at reasonable heights and dimensions for the purpose in residential areas."

The bill would ask the Secretary of Homeland Security to conduct a study of the uses and capabilities of amateur radio in emergencies and disaster relief. The bill urges the Secretary of Homeland Security to "utilize the expertise of the ARRL and seek information from private and public sectors for the study."

### Poll Rates BBG "Worst Place to Work"

An article in the *Washington Post* from April 24 details the results of a survey conducted by the Office of Personnel Management which found that among employees of 37 federal agencies, the Broadcasting Board of Governors (BBG), parent organization of the Voice of America, came in dead last in three out of four categories. According to the article, the categories were leadership and knowledge management, results-oriented performance, and talent management. BBG's best score (a 36th ranking) came in the category of job satisfaction.

The best federal agency to work for, according to the poll? The Nuclear Regulatory Commission.

### CA Student/Hams Sweep Science Awards

Granite Bay (CA) Montessori School scored a sweep with a group of its student/hams in the Sacramento Regional Science Fair this past March. The five actually scooped up nine awards in all, with three of the five projects based on amateur radio and all five award recipients holding amateur radio licenses, according to an article on **ARRL.org**.

Projects included a self-contained solar-powered backpack HF station; a robotic data link that operates on the 70 cm band; a study of the greenhouse effect and greenhouse gases and the aerodynamics of roofs in high-winds.

This last project was the effort of the only girl in the group. Though her project didn't place, it did earn her a special award from the National Society of Professional Engineers.

Brian Lloyd WB6RQN, who wrote the piece for the ARRL, started the school's science program three years ago, which includes an introduction to amateur radio. The parents and school administration are said to be so happy with the program, they have made earning a Technician class license an official part of the fifth grade curriculum and turned Field Day into an official school function. For a full report on the students' activities go here: **www.arrl.org/news/features/2009/04/15/10770/?nc=1**

## PUBLIC SERVICE

### Windsor Silences Scanners

An article in the *Windsor Star* (Ontario, Canada) warned that the city's switch to a digitally encrypted radio system in April would silence thousands of scanners throughout the city. A police spokesman is quoted in the article as saying that the protection of privacy of accused criminals and victims is the reason for the switch. The $10 million radio makeover was also called "a natural progression in technology." But, not to worry, the article points out that the police have themselves created a website which will list the incidents citizens will have missed by not being able to tune in.

### Cleveland's Unending Police Radio Quagmire

The *Cleveland Plain Dealer* reported on April 13 the on-going saga of police and rescue radio system woes in that city. After disruptions, software crashes and mechanical break downs, the paper noted that $2 million dollars worth of new radio equipment couldn't be used because vital parts to complete the system were not purchased. Those parts, according to the article, would cost the city additional millions.

The Motorola system was supposed to make police, fire and other departments compatible and was purchased using a federal grant awarded in 2005. That system is now to be scrapped, according to the article, in order to build yet another system, this one compatible with ones used in the surrounding Cleveland suburbs and estimated to cost between $30 and $60 million.

### Boating This Summer? Be Prepared

The U.S. Coast Guard rescued two mariners from a life raft off the coast of Costa Rica after the boat in which they were traveling from California to Texas, via the Panama Canal, sank. The two had packed a survival bag and a 406 MHz EPIRB (Electronic Position Indicating Radio Beacon) beacon and lived to tell the tale.

The search for the two began when the 11th Coast Guard District Rescue Coordination Center in Alameda, California received the EPIRB signal registered to the stricken vessel. A Coast Guard C-130 crew from Sacramento located the life raft and dropped food, water and a radio to the survivors, who waited until the Coast Guard cutter *Sherman* arrived to take the pair in. You don't have to be traveling in international waters to need an EPIRB in your survival bag. It can be a life-saver.

## NAVY/MARINE CORPS MARS PROGRAM TO DISESTABLISH

The Commander of the Naval Network Warfare Command (NNWC) has decided to "Sunset" the Navy/Marine Corps MARS (NAVMARCORMARS) mission as of September 30, 2009. In a recent message from the NAVMARCORMARS Chief, Bo Lindfors stated that his civilian position and all military positions will be unfunded as of the date above. As of presstime the Office of the Chief of Naval Operations (OPNAV) had not yet approved the request from NNWC.

All three military MARS services have operated under a 1998 Department of Defense (DoD) instruction (4650.2), but that is about to change. A new instruction (4650.02) is in the final stages of being released and will increase the services' requirements to support the MARS programs within their service. This instruction will also change the name of MARS from Military Affiliate Radio Service to Military Auxiliary Radio Service. This instruction will address the Civil Air Patrol service and will be lumped into this new instruction.

The Army and Air Force have agreed to the changes addressed in the new instruction, but the Navy has asked to be let out of this DoD requirement.

According to Lindfors, if the Navy's request to be let out of the new MARS requirements is not approved, there will be a Navy-Marine Corps MARS program, but it will not have Area Directors, and all correspondence will be handled by the State Directors and Chief of Navy MARS directly. According to the message, area deputy directors and area staff positions will be retained to coordinate frequency matters, training and other service MARS issues.

We will continue to follow this story, and you can get the latest information on the Milcom Monitoring Post blog at **http://mt-milcom.blogspot.com/**.

*– Larry Van Horn, MT Assistant Editor*

## TV/RADIO BROADCASTING

### FCC to Reform AM & FM License Rules

The FCC's new Democratic majority has wasted no time in shaking up the way things are done at the Commission. The FCC released a Notice of Proposed Rulemaking (NPRM) covering more than 20 pages, seeking comment on a wide range of proposed changes. Among those changes are the way the Commission awards commercial broadcast spectrum in both the AM and FM bands.

Acting FCC chairman Michael J. Copps wrote, in a statement released with the NPRM, that the proposed rulemaking was long overdue. "Our allotment and assignment policies have been transformed over time into an arcane parlor game that only industry insiders know how to play," He said. He added that the changes would "level the playing field," stating that more emphasis would be given rural areas.

Commissioner Jonathan Adelstein echoed the chairman, charging that the current system of license granting "has become rife with inequalities." He noted that, "In communities on the outskirts of more urbanized areas, potential licensees have taken advantage of our procedures by using nearby communities as backdoors to reach larger, well-served, urban areas."

Among the proposed changes would be to establish a priority for Native American and Alaska native tribal groups serving tribal lands; limit the moves of existing stations from smaller communities; establish a cap on the number of AM applications that may be filed in an auction window, and prohibit FM translator "band hopping" applications (the practice of modifying an existing translator permit in order to move to the non-commercial part of the FM band without having applied for an NCE translator permit). The reward for this practice is to take advantage of the less restrictive rules for NCE stations regarding signal delivery via satellite and terrestrial microwave facilities.

### HD Radio Lurches Forward

iBiquity Corp., the rulers of the HD Radio universe, have announced two new steps that could help create more interest in HD Radio among consumers. The first is the release of a new firmware load for Samsung EM's HD Radio chipset. The new firmware allows dramatically reduced overall power consumption, as low as 165 mW according to iBiquity sources, that will allow it to be used in a variety of portable radio applications.


***Coby HDR700 could be the first of many portable HD-Radio capable radios available this year. (Courtesy: Coby U.S.A.)***

The second step is the formation of a joint venture called Broadcast Traffic Consortium (BTC) comprised of eight leading radio companies to build "a first-of-its-kind nationwide network to distribute traffic data via radio technology," according to an iBiquity press release. The venture brings real-time traffic updates delivered via traditional RDS on standard FM or via digital HD Radio front panel display. The agreement brings the service to 77 FM-RDS markets and 63 HD Radio Data markets.

## SATELLITES

### The Hidden Dishes of Cuba

Nothing says freedom of information like a satellite dish, and in some countries just having a dish on your premises could land you in hot water with authorities. That's the case in Cuba, where, according to an article in the South Florida *Sun-Sentinel*, it's estimated that as many as thirty thousand satellite dishes let Cubans tune into to unapproved satellite TV services via pirated access cards every day. A flourishing industry in recordings of popular satellite TV shows further expands that viewer base.

The official Cuban government line is that such satellite TV programming is anti-revolutionary. But, what vital message of freedom are these oppressed TV viewers hiding from authorities to watch? According to the article, the most popular programs watched by the Cubans are Spanish language soap operas.

### Iran's Space Woes

Launched amid much fanfare on February 2, Iran's Omid satellite has fallen to Earth, according to a report on **SpaceWeather.com**. Omid's launch was part of the 30th anniversary hoopla commemorating the Iranian revolution. The low Earth orbit satellite, which used a downlink frequency centered around 465 MHz, was said to be designed for communications purposes and just the beginning of an ambitious space program.

However, on April 25 the satellite plunged to Earth over the South Atlantic Ocean east of Buenos Aires to no fanfare or hoopla. That same report said that part of the booster rocket that launched the satellite remains in orbit.

### Just What Iridium Needs: Competition

SkyTerra Communications has announced the upcoming launch of one of two new satellites in a phone system designed to fill in the large gaps in under-populated regions of the U.S. According to the company, both satellites will be the most powerful geostationary satellites ever deployed and said to cost $1.2 billion. The system will use cell phone services unless the unit is out of range, in which case it will switch to satellite mode. Planned coverage will include all of North America (including all of Alaska and arctic Canada, Hawaii and all of the Caribbean), as well as a sizeable chunk of South America.

***Artist's concept of new, small hand-held satellite/cell phones planned for use in SkyTerra Communications' new U.S. telephone service. (Courtesy: Sky Terra)***

According to a report in the *Seattle Times*, SkyTerra will have launched its first satellite by the time this report is published. Customers will have a choice of various handsets smaller that those currently used by Iridium customers. Handsets will likely sell for $700 and have service capabilities similar to Blackberry and iPhone products. Cost of the service will likely be similar to that of Iridium, about $1/minute according to reports.

### XM Board Smells the Coffee

After years of routinely handing XM CEO Mel Karmazin a $30 million bonus atop his million dollar salary, despite the fact that his company had never turned a profit, the XM board of directors compensation committee has suddenly woken up to economic reality. According to the company's preliminary proxy statement filed with the SEC April 20, "Unprecedented global economic conditions presented challenges for many companies in 2008, including us. The decline in current market conditions and related changes in the status of our business caused us to make adjustments to our compensation program in 2008."

SIRIUS | XM SATELLITE RADIO

***Sirius/XM logo (Courtesy: Sirius/XM Satellite Radio)***

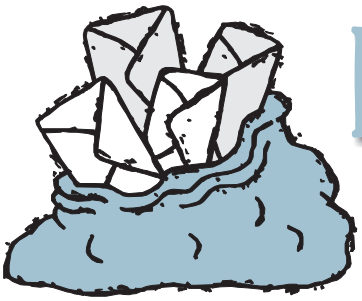
Of course, the committee reserved the right to throw wads of money at the top executives should the economy turn around this year, so, if Mel can just hang tough and learn to make do on his old $1 million/year paycheck, he may yet get his big bonus.

## FCC ENFORCEMENT

### FCC: WDTI-TV, Where Are You?

FCC agents had a hard time finding Indianapolis religious broadcaster WDTI-TV, a Daystar satellite affiliate feed, when they responded to a complaint that the station, in fact, had no studio. What they found on the campus of Butler University was "…a transmitter surrounded by a locked fence in a windowless brick building." According to FCC documents, the university leases transmitter space to Indianapolis Community Television, Inc. (ICTI), licensee for WDTI-TV.

So the Commission issued a Notice of Apparent Liability for Forfeiture in the amount of $9,000 for "…failing to maintain a publicly accessible main studio, a meaningful management and staff presence at its main studio, a listed local telephone number, and failing to notify the Commission of the relocation of its main studio." Time to flash that 800 number and beg for more money!



# LETTERS TO THE EDITOR

## Narrowbanding

"A recent inquiry to the FCC's Help Desk about the need to modify licenses for the addition of narrowband Emission Designators (if they were already authorized for wideband emissions) elicited the following statement from the Commission:

"***Applicants have typically licensed for the largest bandwidth permitted by the rules regardless of whether their transmitters operated with a smaller bandwidth. Larger licensed bandwidths would provide for the use of smaller or equal bandwidths. So a licensed bandwidth of 20 kHz (such as 20K0F3E) would provide for authorization to use a bandwidth of 16 kHz (such as 16K0F3E) or for that matter, any bandwidth less than or equal to 20 kHz (such as 11K0F3E). Commission licenses however should accurately reflect the actual operating parameters of their associated facilities/transmitters.***

**"**A response like the above really makes one wonder what the hype is all about regarding the addition of narrowband Emission Designators to licenses before a January 1, 2013 deadline. Evidently, wideband Emission Designators allow for the operation of narrower emissions. It hardly seems necessary to go through the mandatory effort and expense of re-coordination and re-licensing just because licenses '...should accurately reflect the actual operating parameters of their associated facilities/transmitters.'

"Operating a narrowband transmitter under the authorization of a wideband Emission Designator seems very much like operating a transmitter with an output power that is lower than the output power authorized by a license. It is NOT illegal, it just doesn't '...accurately reflect the actual operating parameters of their associated facilities/transmitters.'

"The operation of radio equipment with narrowband transmissions could still be made mandatory, but it does NOT seem to justify a requirement to have narrowband Emission Designators on a license. If the Commission wants all licenses to have mandatory narrowband Emission Designators, why don't they simply add them to every license, and eliminate the tedious need for coordination and filing? Mandatory license modification for narrowbanding seems like nothing more than a carefully-crafted method to inflate the coffers of the frequency coordinators and the Commission."

*Roger Miller*

In this issue, Dan Veeneman goes into more history and background on narrowbanding and how we got here and what we can expect. But since nothing is ever simple, I'm sure we'll continue to hear more about it as 2013 approaches.

## Finding Frequencies

"I just read your *Scanning Report* in the 2009 June issue. Good info. I thought I'd pass along the process that I use to find a frequency. It's a 3 step process, but if it's licensed through the FCC, it should be found.

"I use **http://maps.huge.info/zip.htm** to find the zip code for the area that I'm interested in scanning. Once the zip code is found, then use **http://antennasearch.com/default.asp** to search for the FCC licensed user (call sign) within the zip code (no amateur radio op's). I then use **http://wireless2.fcc.gov/UlsApp/UlsSearch/searchLicense.jsp;JSESSIONID_ULSSEARCH=YLGjJh9KWVp3pQrGbxpcvxVDm1Htp0TCwMnPGNnHLs1gshC1vXr7!1528924042!1013154302** to find the frequency that is FCC approved to the call sign.

"It sure beats the many hours of searching. I just thought that you'd be interested."

*N8WAC, Tony*

## Monitoring Ultrasound

"After I read the April 2009 *On the Bench* article 'Monitoring Ultrasound,' I was curious if the Ultra-RX1 would pick up natural radio in the band of 40 kHz without being plagued by 60 Hz and its harmonics. It does!

"I put together the kit and designed and it works perfectly to pick up ultrasound audio. Then in place of the ultrasound microphone, I connected a LF Engineering loop antenna. I was immediately surprised how the Ultra-RX1 came alive with sound – mostly white noise, but at times varying tones (indicating sine wave carriers being received), some appliance noises once in awhile, and lots of lightning crashes. And there is no 60 HZ and harmonics noise, even right here in my apartment!

"However, I have not heard any whistlers or other audio sounds that come with natural radio in the regular audio range. And it is interesting that the lightning static does not travel as far in the ultra-sound band as in the regular sound band. At night, in ultra-sound, I hear the lightning here in ABQ up to mid TX and OK. In the regular audio band, at night I pick up lightning way into the Gulf of Mexico and into Mexico, along with the whistlers and clicks that sometimes come with it.

"*Monitoring Times* magazine certainly spurs the mind to experiment with different fun things. A recent article on the 555 IC timer had me build a missing pulse detector. I had been looking for a way to detect very short millisecond power outages, and the missing pulse detector works for that. And I really like my Uniden BC396T that was in the Grove Enterprises Bob's bargain bin."

*William Tobin, Albuquerque NM*


***Stephen Takacs snapped this photo at a USMC Air Ground Demo at Eisenhower Park, Long Island. As you see in our feature stories, opportunities for military scanning are all around you!***

## Streaming the Classics

Martin W. wrote in response to the *Programming Spotlight* Column by Fred Waterer in the April 2009 *Monitoring Times*. He says, "I would like to direct your attention to two of the all time great classical music stations that can now be accessed on the Net both emanating from New York City – WNYC FM 93.9FM overnight at **www.wnyc.org** (hit the "listen Now" button) and WQXR FM 96.3FM at **www.wqxr.com** (hit the "listen Live" button)."

## Monitoring Monthly Folds

Several years ago, *Monitoring Times* and its counterpart in the UK, *Short Wave Monthly*, had a subscription fulfillment arrangement. Then the publisher rolled *SWM* and *Radio Active* into a single magazine called *Radio User*. Several of the former *SWM* staff then created their own hobby magazine called *Monitoring Monthly* - a very attractive, full-color magazine. However, after a run of several years, it announced at the end of April that it, too, is ceasing operation.

Now, some of the staff members are discussing continuing the magazine as an e-zine. They were soliciting input and interest at Monitoring-Matters-subscribe@yahoogroups.com

## Hawaiian Geography Lesson

Both Dave Alpert of ABC News in Los Angeles, and Bob Lowry of Scottsdale, AZ, enjoyed Loyd Van Horn's *GlobalNet* column on Hawaii in the May issue. However, "Just one thing – Honolulu is on Oahu, *not* on the Big Island, and I don't think any of Hawaii's 'bigger stations' are there, either." *Dave Alpert*

Lowry adds, "I've been to the islands a dozen times and get my music fix via Internet links in between trips. ...I think you'll find that most major stations are on Oahu (Honolulu). Most of the stations you mention are either in Honolulu or on Maui.

"In fact, I had business with a few of the radio stations in Kona and Hilo on the Big island a dozen years or so ago and they are, for the most part, smaller operations. Hilo really focuses on locals since the east side of the Big Island doesn't get nearly as many tourists as Kona or the towns on Maui or Oahu."

*Bob Lowry*

## Remembering D-Day

Two folks wrote regarding the June article by Eric Beheim about how D-Day played out on the radio:

"Your article about D-Day in the June *Monitoring Times* is a great piece of work! However, I think you might find that the person you call Richard C. Hartlett is actually named Richard C. Hottelett, and the newsman you refer to as Quintin Reynolds is actually Quentin Reynolds. A book I've found helpful is *World War II on the Air* by Bernstein and Lubertozzi, published by Sourcebooks."

*Brian Rogers, KD8HAZ*

"I just sent an email to Eric Beheim thanking him for his superb article on D-Day. My father, Ervin G. Lewis – now deceased – was a war correspondent for WLS Chicago and reported from England, France, and the Netherlands with his reports being relayed back via the BBC. Among other things, he recorded interviews with soldiers from the Mid West and sent those back. Thank you so much for publishing this excellent work!"

*Jefferson E. Lewis, Kansas City.*

***This column is open to your considered comments. Opinions expressed here are not necessarily those of Monitoring Times. Your letters may be edited or shortened for clarity and length. Please mail to Letters to the Editor, 7540 Hwy 64 West, Brasstown, NC 28902 or email editor@monitoringtimes.com***

***Happy monitoring!***
***Rachel Baughn, Editor***

# *Warbirds on Display*
## A California Vacation

By Bruce Ames, KE6HPK

*"You're gonna stay right here and get a bellyful of flying. You're gonna make every mission. And I want you to paint this name on the nose of your ship: Leper Colony,"*

These words are from the famous movie about the air war of B-17's over Germany – *12 O'Clock High* – as General Frank Savage struggles to improve unit performance by giving a severe tongue lashing to his Executive Officer Lt. Col. Ben Gately.

I salute Larry Van Horn and his usual excellent job in producing the annual *Monitoring Times* Airshow edition, now on line at **www.monitoringtimes.com/MT_Airshow_2009.pdf**. Whereas Larry published the schedules and frequencies of the major performers who are flying in current airshows, this article will give you insights into aircraft which are no longer seeing action. Specifically, we focus on taking a vacation to the beautiful state of California to see some wonderful museums strictly dedicated to warbirds of every era from WW-II to the Gulf War. Many museums let one get up close and actually touch aircraft that saw aerial combat. Whether one takes a vacation in the Northern, Central or Southern part of California, there is a museum for you.

Air war is brutal and it was especially so in WW-II in the European theatre with the American daylight bombing raids of B-24 *Liberators*, B-17 *Flying Fortress*, and the B-25 Mitchell medium bomber. These raids extracted horrifying casualties among the men that carried them out. In the war against Japan, it was primarily a Navy war with planes operating off carriers and small atolls in addition to the frightening fire raids on Japan by the B-29 *Super Fortress.*

## Northern California

### DOS PALOS (near Los Banos)
**Central California Historical Military Museum – www.eaglefield.org**

This museum is at a private airfield and no frequencies are published for it. Eagle Field was a training depot for thousands of flyers during WW-II. The museum is active, and hosts a big band dinner dance every year. (Unfortunately, the 2009 event will have happened by the time you read this.) Although this is a small museum, it has a lot of interesting artifacts, including a couple of Mitchell B-25 bombers. Eagle Field frequently hosts aviation fly-ins, especially those featuring the B-25.

### FAIRFIELD
**Travis Air Force Base – www.travisairmuseum.org**

The Museum of Military Aviation History at Travis Air Force Base is one of the largest on the West Coast. Its collection of American military aircraft ranges from various periods: fighters, bombers, trainers, cargo and liaison aircraft. Exhibits showcase Jimmy Doolittle and the Tokyo Raiders, the 15th AF in WWII, the Tuskegee Airmen, the Berlin Airlift, and the history of Travis AFB, with special emphasis on the Korean War and the war in Vietnam.

Many service members (including me) flew into and out of Travis for the long flight to Southeast Asia and the Vietnam War. While at the expansive museum, check out a truly unique aircraft, the C-119A *Packet - Flying Boxcar.*

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|---|---|
| Approach | 119.900, 126.600, 128.400, 291.000, 322.325, 398.200 |
| ATIS-Digital | 116.400, 384.900 |
| Clearance | 127.550, 335.800 |
| Cmd Post | 141.900, 349.400 |
| Departure | 119.900, 126.600, 291.00, 306.900, 322.325 |
| Ground | 121.800, 289.400 |
| PMSV | 269.200 |
| PTD | 285.575 |
| Tower | 120.750, 239.050, 254.400 |

### MOUNTAIN VIEW
**Moffett Field Museum – www.moffettfield-museum.org**

This is a neat place to put on your visit list. Moffett Field was originally a Naval Air Station which closed in 1994 and became a Federal Airfield. It shares the field with NASA Ames, which is home to flight testing for some of the most advanced aircraft. NASA has done flight testing on the V-22, the Boeing 777, and many more.

Now known as Federal Airfield Moffett, it is home to the ER-2, the earth reconnaissance version of the top secret U-2.

What is truly awesome are two super huge buildings on the airfield. One is the 80 x 120 ft. wind tunnel, at one time the largest wind tunnel in the world, and the infamous Hangar One. In the 1930s, Hangar One was home port to the largest Navy Dirigibles, the *U.S.S. Macon* and the *U.S.S. Akron*. The *Macon* crashed in a tumultuous storm in 1935 off the coast of Monterey, ending the Navy's use of dirigibles.

Hangar One is so large that is actually develops its own weather inside the building. It has since been closed off to all visitors and personnel due to asbestos. If you want to see period photos of Hangar One, go to the National Park Service website **www.nps.gov/nr/travel/santaclara/usn.htm**

The museum is currently home to a P2V *Neptune*, a U-2, a Mercury Space capsule and other memorabilia.

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|---|---|
| ALCP | 349.400 |
| ANG Rescue | 5.711 USB, 390.900 |
| Approach | 120.100, 135.200, 133.950, 134.500 (NorCal) |
| ATIS | 124.175, 283.000 |
| AWOS | 124.175 (650-604-1529) |
| Base Ops | 251.700 |
| Clearance | 380.800 |
| CTAF | 119.550 |
| Departure | 121.300 (NorCal) |
| Ground | 121.850, 336.400 |
| IC | 135.200 |
| PMSV | 343.300 |
| Radar | 300.400, 325.200, 328.400, 363.600 |
| Tower | 119.550, 340.200, 346.250 |

Note: San Francisco Class B airspace

## SACRAMENTO

### McClellan Air Force Base - www.aerospacemuseumofcalifornia.org/

McClellan was a major base until government closure decommissioned the facility a few years back. It specialized in aircraft repair and logistics. On the old base is an excellent museum entitled the Aerospace Museum of California. Its collection boasts of aircraft ranging from a 1932 Curtiss-Wright B-14B *Speedwing* to the Vietnam-era Douglas A-1 *Skyraider* and Douglas F-4 *Phantom*, as well as a MIG-17 and MIG-21.

One of the original Norden bomb sights is on display; these were used by bombardiers for precision daylight bombing in WW-II. For adrenaline junkies, you can try out a pilot motion ride simulator for the WW-I *Spad*, WW-II P-38 *Lightning* or P-51 *Mustang*. They also have a simulator to experience the launching of a USN F/A-18 *Hornet* off an aircraft carrier!

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|---|---|
| Approach | 127.400 (NorCal) |
| AWOS-3 | 125.975 (916-641-1272) |
| Clearance | 119.825 |
| CTAF | 122.975 |
| Departure | 127.400 (Norcal) |
| PMSV | 344.600 |
| Unicom | 122.975 |
| Coast Guard San Francisco | (all HF) 3.123, 5.696, 8,984, 11.201 |
| USCG Sacramento | 167.900, 237.900 |


### Beale Air Force Base (Marysville) - www.beale.af.mil/

Located just north of Sacramento

Beale has a museum on an active Air Force base that displays an A-26, KC-97, SR-71 and a U-2. I cannot find any specific details on the museum, so I suggest if you want to visit, call their Public Affairs Officer at (530) 634-2038.

| | |
|---|---|
| Approach | 125.400 (NorCal) |
| ATIS | 273.500 |
| CTAF | |
| Departure | 125.400 (NorCal) |
| Ground | 121.600, 257.750 |
| PTD | 140.875, 372.200 |
| Supvr of Flying | 138.500, 240.225 |
| Tower | 119.400, 276.150 |
| 940th Cmd Post | 256.025 |
| Wing Cmd Post | 311.00, 321.00 |

## OAKLAND (ALAMEDA)

### USS Hornet CV-12 Museum - www.uss-hornet.org/

The *U.S.S. Hornet* with which we are all familiar was the carrier CV-8 that launched 18 B-25 medium bombers led by Jimmy Doolittle in 1942 against the Japanese Home Islands. This carrier was subsequently lost in the Battle of Santa Cruz in October 1942.

The Hornet's name was again christened in 1943 as CV-12, and that is the carrier and air museum we have today. It currently is open to the public at what used to be Alameda Naval Air Station. That base was closed in the early '90s. There is also a museum at the remnants of the air station **www.alamedanavalairmuseum.org**

The Hornet museum includes the Grumman S-2 anti-submarine tracker, F-4 *Phantom*, the F-14 *TomCat* and many others. There is also an Apollo Lunar Lander and the Apollo 14 space craft. The *Hornet* served admirably from WW-11 up to Vietnam and subsequently in the early Apollo moon missions. The old base has been decommissioned and is now known as the Alameda Point Collaborative. They are licensed on 464.500 MHz.

## SAN CARLOS

### Hiller Aviation Museum - www.hiller.org

This museum is located off US-101 on the San Carlos airport between San Jose and San Francisco. It specializes in vertical flight (i.e., helicopters) and sponsors many events related to that field of aviation throughout the year.

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|---|---|
| Approach | 133.950, 135.650 (NorCal) |
| ATIS | 125.900 (650-593-0613) |
| CTAF | 119.000 |
| Departure | 135.650 (NorCal) |
| Ground | 121.600 |
| Tower | 119.000, 326.200 |
| Unicom | 122.950 |

## SAN MARTIN

Wings of History - **www.wingsofhistory.org/**

The Wings of History Museum is dedicated to the preservation and restoration of antique aircraft as well as other aviation artifacts. You'll find it located on US-101 just north of Gilroy (claim to fame – Garlic Capitol of the World **http://gilroygarlicfestival.com/**) at the South County Airport in San Martin. They have a full-size replica of the 1903 Wright

flyer, a few home-builts, and aircraft from the late '20s. They even have an early version of a Bill Rutan aircraft called the Rutan Quickie.

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| Approach | 124.525 (NorCal) |
| CTAF | 122.700 |
| Departure | 122.100 (NorCal) |
| Unicom | 122.700 |

### SANTA ROSA

Pacific Coast Air Museum - **www.pacificcoastairmuseum.org/**

Located at the Sonoma County Airport, this museum had a wide and varied collection of aircraft ranging from the *Skyhawk* to the P-51, to the Korean-era *F84* and *F-86* aircraft. It's a great chance to see the infamous T-33 *Shooting Star* along with other advanced training aircraft. They also have in their collection the Douglas C-118 *Liftmaster,* which is the military version of the DC-6.

The Air Museum also has a spectacular airshow every August. This year's "Wings Over Wine Country" Air Show is August 15-16. World class performers and an array of military aircraft will be spotlighted, including a vintage P-38. Check their website for schedules and performers.

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|---|---|
| Approach | 128.800, 353.500 (Oakland ARTCC) |
| ASOS | (707-573-8393) |
| ATIS | 120.550 (707-545-2847) |
| CTAF | 118.500 |
| Departure | 128.800, 353.500 (Oakland ARTCC) |
| Unicom | 122.950 |
| On Field FBO | 122.950 |

### WATSONVILLE

Watsonville Fly-In - **www.watsonvilleflyin.org/index.html**

This is the primo fly-in, in my opinion, for all of the West Coast. For many years, it was known as the Watsonville Antique Fly-In and Air Show. It is now known as just the Watsonville Fly-In, and the event happens every year on Memorial Day weekend. Be sure to make plans for it next year!

If you're a car buff, the Fly-In is held in conjunction with a spectacular antique car show. The theme for the Watsonville Fly-In this year is "Salute Our Heroes." In addition to the many WW-II warbirds scheduled to make an appearance, the AV-8 *Harrier* and a USAF McDonnell Douglas C-17 transport are expected.

Watsonville is slightly south of surf city Santa Cruz and north of Monterey and Carmel. This is one event where aircraft buffs can get up close and personal with the actual planes and crews.

| | |
|---|---|
| Approach | 127.150 (NorCal) |
| ASOS | 132.275 (831-724-8794) |
| CTAF | 122.800 |
| Departure | 127.150 (NorCal) |
| Unicom | 122.800 |

## Central California

### ATWATER (Merced)

Castle Air Museum – **www.elite.net/castle-air**

This is arguably one of the best aviation museums around. The museum is housed on the grounds of what used to be Castle Air Force Base before it closed in the '90s. They currently have trainers, bombers ranging from the B-17 up to the B-52 including a rare B-36 *Peacemaker*, many models of transport aircraft and many types of fighters. They also have on display the Lockheed SR-71A and an actual AVRO B-2 *Vulcan* – hard to see anywhere else.. You may be asking yourself where have I heard of that aircraft? That was the aircraft type they sank in the 1960's James Bond thriller *Thunderball.*

| | |
|---|---|
| Approach | 120.950 (NorCal) |
| ASOS | 132.175 (209-381-0926) |
| ATIS | 124.475 |
| AWOS-3 | 124.475 (209-725-0104) |
| CTAF | 118.175 |
| Departure | 120.950 (NorCal) |
| Ground | 133.575 |
| Tower | 118.175, 235.775 |
| Unicom | 123.075 |
| On Field FBO | 123.075 |

### PASO ROBLES

**Estrella Warbird Museum - www.ewarbirds.org/index.html**

Estrella Warbird Museum is an interesting facility located at the Pasa Robles Municipal Airport. Exhibits cover all eras: WW-I, with a Curtiss JN-4 *Jenny;* WW-II Douglas C-47 *Gooney Bird;* Korea with the North American F-86; and quite a few Vietnam-era aircraft ranging from spotters to attack aircraft, such as the Vought A-7 *Crusader* and the Grumman A-6 *Intruder.* They even have a rare, operational Vultee SNV-1 (BT-13), lovingly known as the *Vibrator.* Many other aircraft are available for viewing.

This is a facility certainly worth checking out. For you non-Californians, the Paso Robles area is also home to many wineries, which are open for tours and tasting. **www.pasowine.com/**

| | |
|---|---|
| Approach | 128.700, 307.00 (Oakland ARTCC – Priest RCAG) |
| ASOS | 120.125 (805-239-3593) |
| CTAF | 123.000 |
| Departure | 128.700, 307.00 (Oakland ARTCC – Priest RCAG) |
| Unicom | 123.000 |
| On Field FBO | 123.000 |

Also monitor Paso Robles RCO on 122.400 and 255.400

## Southern California

### CHINA LAKE

**US Naval Museum of Armament and Technology - www.chinalakemuseum.org/index.htm**

China Lake Naval Air Weapons Station is a Naval Test facility and bombing range. They have on display aircraft from the Vietnam era, in addition to a good display of cruise and guided missiles.

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| Approach | 133.650 (Joshua) |
| ATIS | 322.375 |
| Clearance | 274.700 |
| Departure | 133.650 (Joshua) |
| Ground | 360.200 |
| PMSV Metro | 343.150 |
| Tower | 120.150, 340.200 |
| VFR Advisory | 126.550, 127.500, 133.650, 291.600, 348.700 |

### CHINO

**Yanks Air Museum - www.yanksair.com**

You'll find this museum on the west side of Chino Airport. It specializes in restoring aircraft to flying condition. They have many types of aircraft on display, ranging from many types of WW-II bombers, fighters, and attack planes, to many different types that saw service during the Vietnam era.

**"Planes of Fame" Air Museum - www.planesoffame.org**

This museum is also located at Chino Airport. They have roughly 150 aircraft between their main site at Chino and a smaller facility in Arizona. Many planes are in flying condition, and every year they have a spectacular warbird airshow. (Photos in this article are from that show.)

There are roughly ten restored WW-II Japanese Zeroes in the world, of which only two are in flying condition. This museum has one of the two. They also have a very rare (flying condition) Lockheed L-1049, better known as the Lockheed *Constellation*. This plane is painted as C-121A *Bataan* and served in the Berlin Airlift.

Every year on Armed Forces weekend, the Planes of Fame museum presents a themed air show, this year a "Salute to Grumman Airpower." As *MT* was going to press, I was fortunate to attend the show, which included flights from all eras of Grumman from the late '30s up to the Korean era. One of the highlights in the morning flying was a flight of Grumman F3F, F4Fs, F6Fs, F7Fs, F8Fs, TBM, OV-1 and the J2F 'Duck.' All performed separately and then all of them did several fly-bys in formation.

The afternoon featured the Korean Air War with a T-6, T-33, F-86 and MiG-15; the Pacific WW-II airwar with the famous SBD,

F4U, F6F, Zero, P-40, P-38 and P-51s; the European Theatre featured a fly-by of P-47s, P-38s, P-51s, aB-25s and an A-26. Late that afternoon featured an 'Airpower Flight' with the majority of the above mentioned aircraft. It got to be over a hundred degrees on the air show ramp, so I called it quits before the A-10 Warthog and the C-17 demonstration flights. The airboss frequency this year was 132.55.

All in all, this is a museum you should visit, even if you don't make the annual airshow weekend. There is a lot of warbird flying on just about every weekend. Definitely a must-see if you are in the far-eastern part of Los Angeles.

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|---|---|
| Approach | 135.400 (SoCal) |
| ASOS | 132.175 (951-340-4764) |
| ATIS | 125.85 (909-393-5365) |
| CTAF | 118.500 |
| Departure | 135.400 (SoCal) |
| Ground | 121.600 |
| Tower | 118.500 |
| Unicom | 122.950 |
| On Field FBO | 129.775, 131.375 |

## EL CAJON (San Diego)

**San Diego Air & Space Museum - www.sandiegoairandspace.org/gillespie/index.html**

A truly unique museum that has something for everyone, from the Apollo 9 Command Module to WW-I aircraft such as the Jenny, Spad, and the Fokker. WW-II is represented by aircraft such as the P-40 *Warhawk, P-51D Mustang, Spitfire, F4F Wildcat, F6F Hellcat* and the infamous Grumman SBD-4 (Slow But Deadly) *Dauntless.* Here is your chance to get up close and personal with a MIG-17, a PBY-5A *Catalina* and the Ford 5 AT-B Trimotor.

Also, here is your chance to see an actual Boeing GPS-12 Satellite. There is even a replica of Lindbergh's *Spirit of St. Louis:* The original was built just down the road at Ryan Aircraft. The plant still stands, but is now doing business as Solar Turbines, a division of Caterpillar.

| Gillespie Field | |
|---|---|
| Approach | 124.350 (SoCal) |
| ATIS | 125.450 |
| AWOS-3 | 125.450 (619-449-1228) |
| Clearance | 125.100 |
| CTAF | 120.700 |
| Departure | 124.350 (SoCal) |
| Ground | 121.700 |
| Tower | 120.700, 123.800, 257.800 |
| Unicom | 123.050 |
| On Field FBO | 123.500 |

## PALMDALE

**Palmdale Plant 42 Heritage Park – www.cityofpalmdale.org/airpark/about.html#top**

This Museum is located at the City of Palmdale Regional Airport and features fifteen aircraft of the Korean and Vietnam Wars, including a B-52.

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|---|---|
| Approach | 124.550 (Joshua) |
| ASOS | 118.275 (661-272-3798) |
| CTAF | 123.700 |
| Departure | 124.550 (Joshua) |
| Ground | 121.900, 348.600 |
| Tower | 123.700, 317.600, 236.600 |

## PALM SPRINGS

**Palm Springs Air Museum - www.palmspringsairmuseum.org/**

The Palm Springs Air Museum is located on the grounds of the Palm Springs International Airport and houses one of the nation's largest collections of WW-II flying aircraft. The planes are displayed in modern, air-conditioned, well lighted hangars. The collection includes trainers such as the SNJ, dive bombers, attack aircraft, and medium and heavy duty bombers. The museum also has a library of 6,300 volumes primarily related to American military history and aviation. They frequently have flying events to showcase specific aircraft.

| | |
|---|---|
| Approach | 126.700, 135.275 (SoCal) |
| ASOS | 760-320-7645) |
| ATIS | 118.25 (760-327-2770) |
| Clearance | 128.350 |
| CTAF | 119.700 |
| Departure | 126.700, 135.275 (SoCal) |
| Ground | 121.900 |
| Tower | 119.700, 377.050 |
| Unicom | 122.950 |
| On Field FBO | 129.725 |

Los Angeles ARTCC via Twenty Nine Palms (TNP) provides Approach and Departure Service on 128.150 and 285.600 during hours of 2300-0600.

## RAMONA

**Classic Rotors - www.rotors.org/**

Classic Rotors is one of only three rotorcraft museums in the world strictly dedicated to vertical flight. Of the types on display, they have three that are noteworthy and operational. They are the Piasecki HUP-1 and the Vertol H21B tandem rotor. Also located at the museum is a Russian Kamov Ka26 (NATO code-named *Hoodlum*), which is a co-axial rotor and is the only one certified to fly in the United States. The museum is located at the Ramona Airport.

| | |
|---|---|
| Approach | 132.200 (SoCal) |
| ASOS | 132.025 (760-789-0736) |
| ATIS | 132.025 |
| CTAF | 119.875 |
| Departure | 127.300 (SoCal) |
| Ground | 121.650 |
| Tower | 119.875 |
| Unicom | 122.950 |
| On Field FBO | 122.950 |

## RIVERSIDE

**March Air Museum - www.marchfield.org/**

Adjacent to the March Air Reserve Base, the Air Museum is host to over sixty historic aircraft, along with displays that show the history of March Field, which is now relegated to an Air Reserve facility.

The most significant aircraft in their collection is a rare Bell P-59 *Airacomet* (http://en.wikipedia.org/wiki/XP-59), which has the distinction of being the first U.S. operational jet airplane. In today's nomenclature, this would be classified as a fighter or attack aircraft; at the end of WW-II it had the "P" designator for pursuit.

Also adjacent to March ARB is the P-38 National Museum - **www.p38assn.org**. The Air Museum courtyard contains a bronze sculpture of General Jimmy Doolittle along

with Heritage Tiles commemorating the various bomb groups and squadrons of the 15th Air Force. Other significant aircraft at the museum include a B-57 Canberra bomber, a Lockheed SR-71, a "G" model of the B-17 and a B-29 "A" model, and a Russian Antonov An-2 transport biplane (NATO code-named *Colt)*. The *Guiness Book of World Records* states that the 45-year production run for the An-2 was the longest ever, for any aircraft, only recently beaten by the Lockheed C-130 *Hercules.*

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|---|---|
| AFR Ops | 252.100 |
| Approach | 119.650, 125.500, 127.250, 133.500, 134.000, 135.400 (March) |
| Approach | 119.250, 284.00 (SoCal) |
| ATIS | 134.750, 239.050 |
| Cmd Post | 138.450 |
| CTAF | |
| Departure | .650, 125.500, 127.250, 133.500, 134.000, 135.400 (March) |
| Departure | 119.250, 284.00 (SoCal) |
| Ground | 121.750, 335.800 |
| PMSV | 239.800 |
| PTD | 372.200 |
| Radar | 133.500, 134.100, 271.300, 284.00 |
| Tower | 127.650, 253.500 |

## ROSAMOND

### Edwards AFB – Air Force Flight Test Center Museum - www.afftcmuseum.com/

The Air Force Flight Test Center Museum is part of the Flight Test Historical Foundation, housed in a 12,000 square foot facility on Edwards. There are 8,500 square feet of exhibits and a forty-seat theatre. The museum exhibits covers aviation subjects, such as WW-II flight testing, breaking the sound barrier by Chuck Yeager, and the story of the base's namesake, Glen Edwards. Here is your chance to learn about the past, present and future of flight testing.

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|---|---|
| Approach | 134.05 (Joshua) |
| Sport Approach | 126.100, 132.750, 133.150, 133.650, 269.200, 290.300, 343.700, 348.700 |
| ATIS | 269.900 |
| Cmd Post | 304.000 |
| Sport Departure | 126.100, 132.750, 133.150, 133.650, 269.200, 290.300, 343.700, 348.700 |
| Ground | 121.800, 225.400 |
| Metro (March) | 239.800 |
| NASA | 135.825, 373.150 |
| PMSV | 342.400 |
| PTD | 372.200 |
| Army Quals | 141.100, 339.900 |
| Radar | 134.050, 335.600 |
| R-2508 track | 126.550, 127.500,133.650, 291.600, 348.700 |
| Tower | 120.700, 318.100, 353.600 |

Note: When Sport Approach is closed, Approach is 133.650, 348.700

## SAN DIEGO

### San Diego Aircraft Museum – www.midway.org

I recently had the opportunity to tour the *Midway* and talk with docents, many of them former aviators and crew members of this floating museum. The Midway's official designator is CV-41 and it belongs to the Midway-class of carriers. Although designed in WW-II, she was not commissioned until after hostilities had finished. She is one of the first naval ships to be too wide to use the Panama Canal.

The *Midway*'s career spanned more than forty-seven years from the end of WW-II up to Desert Storm, the longest serving U.S. carrier. It has been lovingly restored now as an aviation museum, in addition to being a floating museum on carrier aviation. There is an excellent self-guided tour; however, in my opinion, the highlights are the aircraft on the flight deck and the hangar deck.

Aircraft available for viewing range from the A-1 *Skyraider*, A-3 *Skywarrior*, *A-6 Intruder*, to the E-2 *Hawkeye* and the F-14 *Tomcat* and the F-18 *Hornet*. Helicopter fans will not be disappointed, with several types on display including a beautifully restored Huey gunship. The Midway museum is downtown, across the water from NAS North Island, and adjacent to the cruise ship terminal. This is one museum worth visiting. I would place the exhibits and restoration of the *Midway* on a par with the *U.S.S. Intrepid* (CVS-11) Air and Space Museum in New York City **www.intrepidmuseum.org/**

### San Diego Air & Space Museum - www.sandiegoairandspace.org

This museum is located in San Diego's Balboa Park and is located in the California Pacific Exposition of 1935-36 Ford Building and after a disastrous arson fire in 1978, it reopened to the public with a smaller but growing collection in 1980. 1981 saw the collection grow so much that they needed an overflow, which, along with restoration, is the primary mission of the annex at Gillespie Field (see El Cajon above).

The museum features a Flight Rotunda, displays on WW-I, the "Great War." There are many good exhibits in the "Golden Age of Flight" and especially on barnstorming. The Golden Age is considered to be 1919-1939.

They also have a special exhibit on Pacific Southwest Airlines, known here on the left coast as PSA and sometimes referred to as Poor Sailors Airline for the cheap fares between San Francisco and San Diego. PSA home headquarters was at Lindbergh Field, now today known as San Diego International. In the airline merger craziness of the '80s, PSA was acquired by USAir in 1988. The PSA fleet was dubbed "Smileliner" because of the huge smile that was painted on the front radome cover of every aircraft. Their marketing slogan was 'Catch Our Smile.' For those of you that would like to see more of this iconic West Coast airline, see **www.jetpsa.com/**

In their Pavilion of Flight, the museum also features a restored Ford Trim-Motor and a MIG-17 and F-4 *Phantom* in aerial combat mode. The museum's larger aircraft are housed in this section. While at the museum, don't miss the Apollo 9 Command Module.

| Lindbergh Field – San Diego Intl. | |
|---|---|
| Approach | 119.600, 124.350 (SoCal) |
| ASOS | (619-296-8934) |
| Digital ATIS | 134.800 (619-298-0997) |
| Clearance | 125.900 |
| Departure | 119.600, 124.350 (SoCal) |
| Ground | 123.9 |
| Tower | 118.300, 338.225 |
| Unicom | 122.950 |

*Note – San Diego International is rated a black-star airport for danger and difficulty in approaches and departures. There is a parking garage at the threshold of Rwy 27 (main landing runway) that if one stands on the roof of the garage, it appears that landing aircraft barely miss the roof. It used to be a great plane spotting location without the hassle of the airport authorities.*

### San Diego Flight Museum - www.sandiegoflightmuseum.org/

This is a small museum located on Brown Municipal Field about one mile north of the Mexican border. All aircraft are two seaters and are in flying condition. The museum gets busier on weekends when members fly their


own personal warbirds in for museum events.

They have several aircraft of which I had never heard or seen. One of their most popular is the Russian Mig-21 (NATO code named Mongol) which has been built in greater numbers than any fighter since WW-II. First flown in 1959, it still soldiers on with several foreign air forces. It is a lightweight aircraft with a powerful engine and is comparable to the U.S. F-104 of the 1970s.

| | |
|---|---|
| Approach | 124.35 (SoCal) |
| ASOS | (619-661-8297) |
| ATIS | 132.350 |
| Clearance | 124.400 |
| CTAF | 126.500 |
| Departure | 125.150 (SoCal) |
| Ground | 124.400 |
| Tower | 126.500, 128.250, 288.100 |
| Unicom | 122.950 |
| On Field FBO | 122.950 |

## San Diego – Miramar

### "Flying Leatherneck Aviation Museum – www.flyingleathernecks.org

The Flying Leatherneck Aviation Museum is located adjacent to Marine Corps Air Station Miramar and is the only official Marine Corps aviation museum in the western U.S. The museum has a wide variety of items on display, ranging from WW-II, Korea, and Vietnam.

Today, MCAS Miramar is home of the 3rd Marine Aircraft Wing, the Aviation Combat Element of 1st Marine Expeditionary Force. Miramar is the former home of the Navy's elite Top-Gun fighter school, which has since been relocated to Nevada.

Some of exhibits include the Korean era F2H2 *Banshee*, the WW-II F4U *Corsair*, the WW-II B-25 *Mitchell*, a fully restored MIG-15 (NATO code-named *Fagot)*, a Douglas R5D *Skymaster* which is the military version of the DC-4 made famous in the Berlin airlift. There is also on display the Fairchild R4Q *Packet* (Flying Boxcar). The museum also has on display variants of the *Intruder*, *Phantom* and the *Skyhawk*.

| | |
|---|---|
| Approach | 132.200 (SoCal) |
| ATIS | 352.000 |
| Clearance | 125.975, 254.325 |
| Departure | 119.600, 132.200 (SoCal) |
| Ground | 128.625, 307.325 |
| PMSV Metro | 342.400 |
| PTD | 335.625 |

| | |
|---|---|
| Radar | 133.625, 266.800, 270.350, 307.900, 328.400, 348.750, 350.275, 373.575, 379.125, 380.300 |
| Tower | 135.200, 298.925, 340.2000 |

Semper Fi!

**SIMI VALLEY**

**Reagan Presidential Library & Museum – www.reaganlibrary.com**

*And as we liftoff aboard Air force One… the winds of freedom will be propelling my mission… As I fly westward over our majestic land, I go knowing that we're witnessing and awakening to those self-evident truths to which our forefathers pledged their lives, their fortunes, and their sacred honor.* Ronald Reagan 23 April, 1986.

The Reagan Presidential Library and Museum is a southern California must-see! One of the pavilions is the Air Force One Pavilion which houses Air Force One, tail number SAM (Special Air Mission) 27000, which flew President Reagan 660,000 miles, to twenty six countries and forty-six United States. This aircraft carried Presidents spanning Nixon to George W. Bush before retirement when the 747 came on-line. SAM 27000 was the plane in which Reagan hand wrote many of his speeches and signed important legislation. A complete walk-through of Air Force One is part of the tour.

Also on display in the Pavilion are the limousines and Secret Service Suburbans used in his motorcades. There is also a VH-3 Marine One helicopter on display. SAM 27000 is the aircraft that carried Reagan to Berlin where he issued his famous challenge on 12 June 1987 at the Berlin Wall's Brandenburg Gate, "*Mr. Gorbachev, tear down this wall.*" This was a symbol of Reagan's desire for increasing freedom in the Eastern Bloc. By his second trip in 1990, the wall was crumbling bits of cement.

## Preparing for your Vacation

Before you start out on visiting or monitoring any of these museums, you should do four things.

#1 – Load in your scanner the FRS frequencies. As some of these museums are small and non-profit, they will use FRS (Family Radio Service) radios.

| | |
|---|---|
| 462.5625 Ch 1 | 467.5625 Ch 8 |
| 462.5875 Ch 2 | 467.5875 Ch 9 |
| 462.6125 Ch 3 | 467.6125 Ch 10 |
| 462.6375 Ch 4 | 467.6375 Ch 11 |
| 462.6625 Ch 5 | 467.6625 Ch 12 |
| 462.6875 Ch 6 | 467.6875 Ch 13 |
| 462.7125 Ch 7 | 467.7125 Ch 14 |

#2 – Load in your scanner the military version of FRS, which is called the Inter-Squad Radio or IRS. You should have these if the museum you are visiting is on or adjacent to a military base.

| | |
|---|---|
| 396.8750 Ch 1 | 397.9500 Ch 8 |
| 397.1250 Ch 2 | 398.0500 Ch 9 |
| 397.1750 Ch 3 | 399.4250 Ch 10 |
| 397.3750 Ch 4 | 399.4750 Ch 11 |
| 397.4250 Ch 5 | 399.7250 Ch 12 |
| 397.4750 Ch 6 | 399.9250 Ch 13 |
| 397.5500 Ch 7 | 399.9750 Ch 14 |

#3 – As some of these museums are on active government facilities, I cannot emphasize enough the need to call ahead to verify access requirements, especially in these days of heightened security. It is also a very good idea to call ahead to the civilian museums, as many of them may not have regular hours. If an air show is also involved, it is all the more important to call ahead to verify times and performances.

#4 – Load in your scanner, Civilian Air Show Discrete Common – 123.150. Also be sure to take along a copy of Mr. Van Horn's Annual Air Show article from the March 09 issue of *MT,* if you are visiting a museum that is also hosting any military teams.

Happy Monitoring!

## About the Author:

Prior to retirement, Bruce Ames was a very frequent business traveler throughout the West for almost thirty years. He is a former feature and column writer for RCMA and *Scanning USA*, and was vice president and newsmagazine editor for (San Francisco) Bay Area Scanner Enthusiasts (BASE). He currently is a moderator on the Internet user group - Scan Fresno. He is a licensed amateur radio operator KE6HPK and GMRS as KAE9222.

*All photos except USS Midway (taken by Rachel Baughn) are by Bruce Ames at the "Planes of Fame" in Chino.*

# Military Operating Areas

By Kevin Burke
All photos by Kevin Burke

Many *Monitoring Times* readers probably do not need a guide to monitoring the Military Operations Areas (MOAs) and associated Training Routes and Refueling Areas, so this article is mostly geared to those just getting involved with monitoring military aircraft. However, I hope to touch on some points that the veteran military aircraft monitor might not have thought of.

## BRAC Assignments

With all of the changes from the Base Realignment and Closure (BRAC) decisions, we need to be up to date on what military aircraft are around us. You really need to know what aviation units have come and gone or relocated, and changes that have yet to be completed.

In New England, for example, the Connecticut and Massachusetts Air National Guard A-10's are gone. CT transferred to C-21 transport planes and the MA unit transferred to F-15C's, while the MA ANG F-15A's from Cape Cod went to the bone-yard. The Air Defense responsibilities of the now defunct 102nd Flight Wing are going to be absorbed by the 104th FW that got the F-15C's. The Vermont F-16's are still active, but the NY F-16's will be traded for unmanned drones.

## Aerial Maps

If you want to listen to military aircraft in the area, it helps to know where the aircraft are actually going to be flying. Fighter and ground attack aircraft do most of their training in the Military Operations Areas or MOAs. As opposed to *restricted airspace* or *prohibited airspace*, a MOA is a type of *special use airspace* (SUA) in which the nature of military operations justify limitations on aircraft not participating in those operations. The designation of "SUA" identifies for other pilots the areas where military activity occurs, provides for segregation of that activity from other fliers, and allows charting to keep airspace users informed. Local flight service facilities maintain current schedules and contacts for the agency controlling each MOA. These MOAs are scattered all over the United States. Some training areas are over the water. Generally these are called Warning Areas.

For informed monitoring, mapping the areas that military aircraft use is the first thing that comes to mind. In the past, most of us would go to the local airport and buy the aeronautical maps. These maps are so large that you really do have to put them on a wall in order to see the MOAs and Warning Areas. The Refueling Areas map (below) has been available for some time, and has been a good reference to see where the refueling takes place.

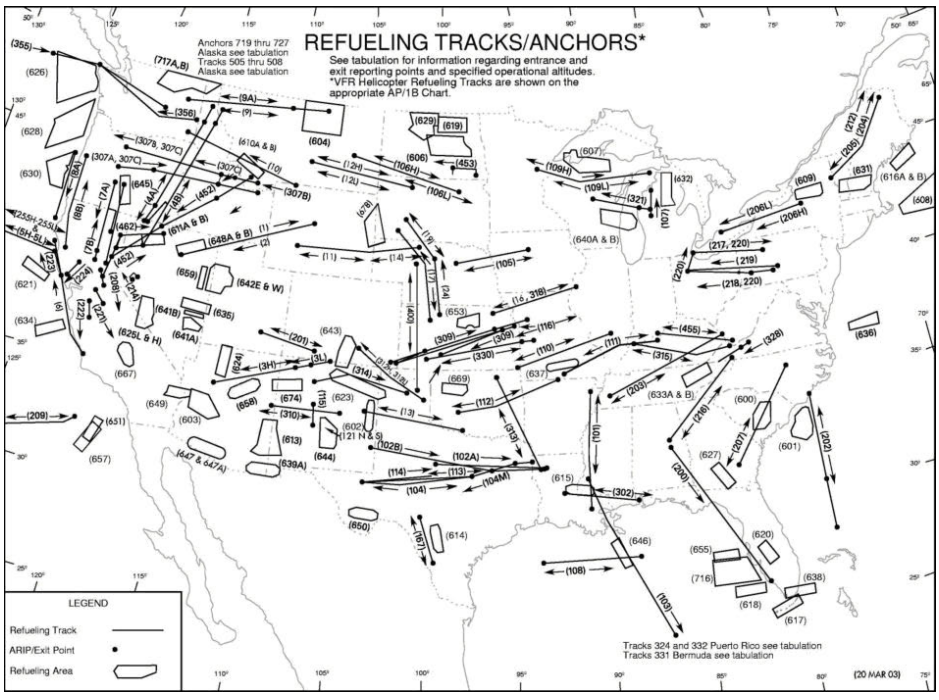
## The Internet is Your Friend

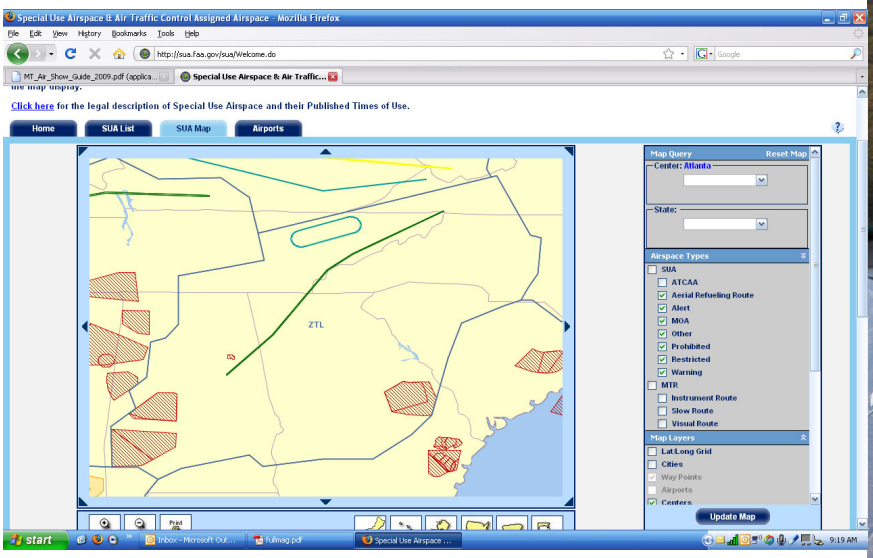
Since the internet has evolved, there is now much more information to find, and so many places where you can look for this information. Through my association with email groups such as *Milcom*, I have been directed to the FAA website which will be described in detail later. There are other email groups out there as well, and you should join a couple of them. You will find frequency information, be directed to informative websites, and could become good friends with very informative people. You will have access to a lot of information from all over the country, and even overseas if you want to join lists from across the pond, too.

Some of my friends who contributed to this article have joined many lists and keep a notebook next to their computer. When someone lists a frequency, they can add it to their log book – not to take any credit for personally 'catching' that frequency, but to add it to their list of frequencies to monitor.

While we are talking about internet groups, we should also keep in mind that information can be obtained by occasionally visiting the websites of your nearby aviation units. I have been directed to web pages depicting flying formations and have found out about deployments and open houses, etc.

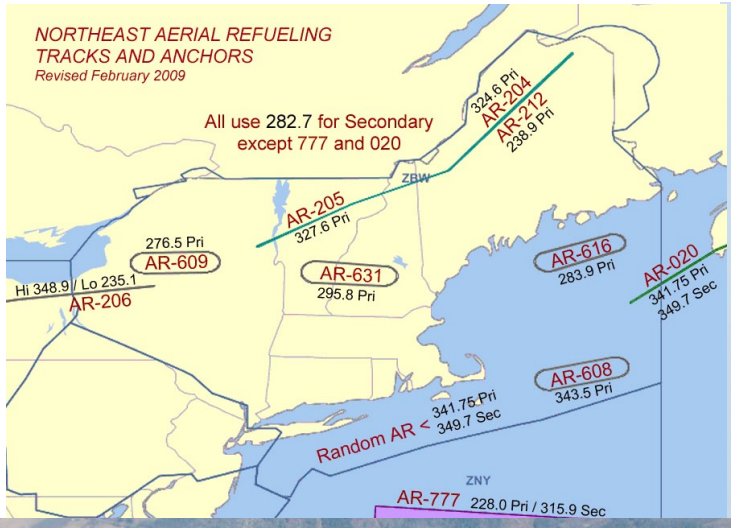
When you do go to an open house, always look for frequency information in any open cockpits. There could be new frequencies or






*A special use area map of the Atlanta ARTCC sector. As seen, pop-up text must be inserted manually on your print-out.*








something as simple as labeling of a frequency to a specific MOA.

## Mapping the Sky above You

To get a grip on where MOAs, Warning Areas, Refueling Areas, Low Level Training Routes, and more are located, I suggest using the website:

**http://sua.faa.gov/sua/special.do?selected=2&sua=conus**

There is a lot of mapped information on that website. I suggest you plan on making a few maps from this site, showing where the MOAs, Warning Areas, low altitude Military Training Routes, and aerial refueling areas are located in your area. You can use the drop down boxes on the right side of the screen to select the Air Route Traffic Control Center of your choice, then select the different items to be displayed. Make sure you scroll your screen all the way over to the right, and make sure you scroll down the right hand side of the page and select all of the boxes in the 'Activation' section.

Once you have the website create the

information you want, save the whole page by doing a "print screen" or cut and paste the image into software that will allow you to add labels and frequency information. As you cursor over the map on the website, a box pops up labeling the area under the cursor. You need to manually add this text in photo editing software. Once you can visualize or make a quick reference guide to the actual locations of the signal traffic, you will have a better idea of where the aircraft are located and what they are doing.

The above map was created by Ed Langworthy as a quick reference to refueling areas and related frequencies in the Northeast. A similar map can be made just showing the MOAs and Warning Areas. Another map that is good to have handy is one that depicts your local Air Route Traffic Control Center. I searched online and could only find home made maps "used with permission, or for personal use," so I did not link to them here. You might find information at **radioreference.com**.

## Scanner Techniques

If you have more than one scanner, you really need to know what are the strengths and weaknesses of your scanners. For example, ALPHA tagging is a terrific feature; it may take a little extra time to add text, but it lets you label frequencies. I only have one scanner with alpha tagging and that is my main scanner.

If you have two other scanners, I would use the slowest one as the "park on one frequency" radio, and the other to scan the band of your choice – either the 225.00 to 400.00 military aviation band, the 138.000 to 143.995 (most commonly used), or the 148.00 to 150.80 band, all in AM mode.

As an example, in 2008 I was hoping to monitor the Boston Red Sox's now famous 2008 home opener flyover. I had three portable scanners with me – and I'm glad I had all three! As soon as my Alpha tag scanner got a hit on a frequency in use by the Vermont ANG F-16's, I "parked" one scanner on that frequency. When the alpha tag scanner got a hit on a Boston Approach controller talking to the F-16's, I "parked" the third scanner there. Then I locked the two "parked" frequencies out on the alpha tag scanner.

It was then that I noticed the controller was talking to the F-16's on one frequency, but the F-16 lead pilot was talking back to the controller on a different frequency. If I only had one scanner with me, I would not have heard as much of the communications. Unfortunately for me, I was located a little too far from the ballpark to see the maneuvering that took place over Fenway Park, and I was unable to hear any pilot to pilot chatter about the routine.

If you have as many scanners as Dan Myers, the premiere, "Wagon Guy," you could search the 138.000 to 143.995 and 148.00 to 150.80 ranges in 25 kHz steps in AM mode, or even program all of those frequencies into one radio. Dan is an excellent source of information, and goes to show another reason you should join the email groups, get to know people, and ask questions.

Remember to give back, though, by mentoring someone else when they are a newbie, and by reporting what you hear. Now, go have fun listening in to the unseen maneuvers going on in the skies overhead! MT

Photo by David Gifford.

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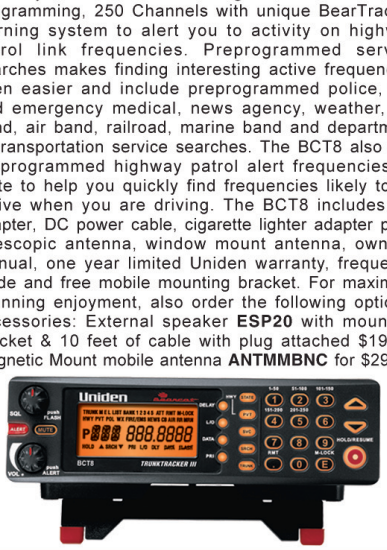

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**APCO 25 9,600 baud compact digital ready handheld TrunkTracker IV scanner featuring Fire Tone Out Paging, Close Call and Dynamically Allocated Channel Memory (up to 6,000 channels), SAME Weather Alert, CTCSS/DCS, Alpha Tagging. Size: 2.40" Wide x 1.22" Deep x 5.35" High**

***Frequency Coverage:***

25.0000-512.0000 MHz., 764.0000-775.9875 MHz., 794.0000-823.9875 MHz., 849.0125-868.8765 MHz., 894.0125-956.000 MHz., 1240.0000 MHz.-1300.0000 MHz.

The handheld BCD396T scanner was designed for National Security/Emergency Preparedness (NS/EP) and homeland security use with new features such as **Fire Tone Out Decoder**. This feature lets you set the BCD396T to alert if your selected two-tone sequential paging tones are received. Ideal for on-call firefighters, emergency response staff and for activating individual scanners used for incident management and population attack warning. **Close Call Radio Frequency Capture** – Bearcat exclusive technology locks onto nearby radio transmissions, even if you haven't programmed anything into your scanner. Useful for intelligence agencies for use at events where you don't have advance notice or knowledge of the radio communications systems and assets you need to intercept. The BCD396T scanner is designed to track Motorola Type I, Type II, Hybrid, SMARTNET, PRIVACY PLUS, LTR and EDACS® analog trunking systems on any band. Now, follow UHF High Band, UHF 800/900 MHz trunked public safety and public service systems just as if conventional two-way communications were used. **Dynamically Allocated Channel Memory** - The BCD396T scanner's memory is organized so that it more closely matches how radio systems actually work. Organize channels any way you want, using Uniden's exclusive dynamic memory management system. 3,000 channels are typical but **over 6,000 channels are possible** depending on the scanner features used. You can also easily determine how much memory you have used and how much memory you have left. **Preprogrammed Systems** - The BCD396T is preprogrammed with over 400 channels covering police, fire and ambulance operations in the 25 most populated counties in the United States, plus the most popular digital systems. **3 AA NiMH or Alkaline battery operation and Charger** – 3 AA battery operation - The BCD396T includes 3 premium 2,300 mAH Nickel Metal Hydride AA batteries to give you the most economical power option available. You may also operate the BCD396D using 3 AA alkaline batteries. Unique Data Skip - Allows your scanner to skip unwanted data transmissions and reduces unwanted birdies. Memory Backup - If the battery completely discharges or if power is disconnected, the frequencies programmed in the BCD396T scanner are retained in memory. Manual Channel Access - Go directly to any channel. LCD Back Light - A blue LCD light remains on when the back light key is pressed. Autolight - Automatically turns the blue LCD backlight on when your scanner stops on a transmission. Battery Save - In manual mode, the BCD396T automatically reduces its power requirements to extend the battery's charge. Attenuator - Reduces the signal strength to help prevent signal overload. The BCD396T also works as a conventional scanner to continuously monitor many radio conversations even though the message is switching frequencies. The BCD396T comes with AC adapter, 3 AA nickel metal hydride batteries, belt clip, flexible rubber antenna, wrist strap, SMA/BNC adapter, RS232C cable, Trunk Tracker frequency guide, owner's manual and one year limited Uniden warranty. Not compatible with AGEIS, ASTRO or ESAS systems. Order on-line at www.usascan.com or call 1-800-USA-SCAN.

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| Bearcat 796DGV 1,000 channel Trunktracker III base/mobile | $519.95 |
| Bearcat BCD396T APCO 25 Digital scanner with Fire Tone Out | $519.95 |
| Bearcat 246T up to 2,500 ch. Trunktracker III handheld scanner | $214.95 |
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| Bearcat 278CLT 100 channel AM/FM/SAME WX alert scanner | $129.95 |
| Bearcat 248CLT 50 channel base AM/FM/weather alert scanner | $104.95 |
| Bearcat 92XLT 200 channel handheld scanner | $109.95 |
| Bearcat 72XLT 100 channel handheld scanner | $99.95 |
| Bearcat BR330T up to 2,500 ch. Trunktracker III with Tone out | $274.95 |
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| Bearcat 350C 50 channel desktop/mobile scanner | $104.95 |
| AOR AR16BQ Wide Band scanner with quick charger | $199.95 |
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| AOR AR5000A+3B Wide Band 10 KHz to 3 GHz receiver | $2,599.95 |
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**Compact professional handheld TrunkTracker III scanner featuring Close Call and Dynamically Allocated Channel Memory (up to 2,500 channels), SAME Weather Alert, CTCSS/DCS, Alpha Tagging. Size: 2.72" Wide x 1.26" Deep x 4.6" High**

***Frequency Coverage:***

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The handheld BC246T TrunkTracker scanner has so many features, we recommend you visit our web site at www.usascan.com and download the free owner's manual. Popular features include **Close Call Radio Frequency Capture** – Bearcat exclusive technology locks onto nearby radio transmissions, even if you haven't programmed anything into your scanner. **Dynamically Allocated Channel Memory** - Organize channels any way you want, using Uniden's exclusive dynamic memory management system. 1,600 channels are typical but **over 2,500 channels are possible** depending on the scanner features used. You can also easily determine how much memory is used. **Preprogrammed Service Search (10)** - Makes it easy to find interesting frequencies used by public safety, news media TV broadcast audio, Amateur (ham) radio, CB radio, Family Radio Service, special low power, railroad, aircraft, marine, racing and weather frequencies. **Quick Keys** - allow you to select systems and groups by pressing a single key. **Text Tagging** - Name each system, group, channel, talk group ID, custom search range, and S.A.M.E. group using 16 characters per name. **Memory Backup** - When power is lost or disconnected, your BC246T retains the frequencies that were programmed in memory. **Unique Data Skip** - Allows the BC246T to skip over unwanted data transmissions and birdies. **Attenuator** - You can set the BC246T attenuator to reduce the input strength of strong signals by about 18 dB. **Duplicate Frequency Alert** - Alerts you if you try to enter a duplicate name or frequency already stored in the scanner. **22 Bands** - with aircraft and 800 MHz. The BC246T comes with AC adapter, 2 AA 1,800 mAH nickel metal hydride batteries, belt clip, flexible rubber antenna, wrist strap, RS232C cable, Trunk Tracker frequency guide, owner's manual and one year limited Uniden warranty. For more fun, order our optional deluxe racing headset part **#HF24RS** for $29.95. Order now at www.usascan.com or call 1-800-USA-SCAN.

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# Scanning St. Louis

Story and photos by John Mayson

In the middle of the seventeenth century two French explorers traveled the Mississippi River valley. Five years later Robert de LaSalle, a fellow Frenchman, claimed the surrounding region in the name of France and bestowed the name "Louisiana" to the newly established territory in honor of King Louis XIV.

An area of particular importance was located near the convergence of the Missouri and Mississippi Rivers. This settlement also took the name of the French monarch, St. Louis. The city would eventually become part of Spain. In a bit of a historical shell game, the city was handed back to France on March 8, 1804 so Napoleon could turn the city over to the United States two days later as part of the Louisiana Purchase. Missouri's largest city has been part of the United States ever since.

The American flag had flown over the city for only two months when Meriwether Lewis and William Clark set off from St. Louis on their famous journey to the Pacific Ocean. Thanks to western expansion and St. Louis' location near two major rivers, the city saw spectacular growth throughout the nineteenth century. By the dawn of the American Civil War, St. Louis was the largest city west of Pittsburgh and the second busiest port in the nation.

While the war barely touched the city physically, St. Louis was devastated economically as trade with the South came to a sudden halt. Soon the war ended and St. Louis once again thrived. In 1876 the city voted to secede from St. Louis County, forming an independent city.

In 1893, Nikola Tesla gave the first public demonstration of radio in St. Louis. And in 2009, we at *Monitoring Times* are proud to present to you, *Scanning St. Louis*.

***Old St. Louis City Hall from the top of the Arch***

## Scanning the City

The city presently has two Motorola trunked radio systems. The older system is analog and carries EMS, public works, and some law enforcement communications. The newer system is digital and carries police traffic. The city's fire department uses conventional VHF and UHF frequencies.

It's important to note that the St. Louis Police Department is run by the St. Louis Board of Police Commissioners which answers to the governor of Missouri, and not the mayor. The mayor is a board member on the Commission. As a consequence of St. Louis being independent of St. Louis County, the city has its own sheriff's department, which provides security to the city's courts and operates the city's detention centers.

## City of St. Louis Metropolitan Police Department

In 1808, the city's police force was comprised of four men. Today 1,400 men and women serve and protect the citizens of St. Louis. They are the primary users of the digital trunked radio system that came online earlier this year. The city sheriff, fire and EMS departments are slated to have a few talkgroups.

At present time, only the frequencies shown in Table 1 are used. The frequencies listed in Table 2 are also licensed. Anyone wishing to monitor the system is advised to enter all the frequencies from both tables in anticipation of the second list of frequencies coming into use.

**Table 1. Digital TRS frequencies currently in use**

855.4625
856.4625
856.7125
857.4375
857.4875
857.7125
858.4625
858.4875
858.7125
858.9375
859.4375
859.4875
859.7125

**Table 2. Digital TRS expansion frequencies**

856.4375
856.4625
856.4875
856.7125

856.7375
857.4375
857.4625
857.4875
857.7125
858.4375
858.4625
858.4875
858.7125
859.4375
859.4625
859.4875
859.7125
860.4375
860.4625
860.4875
860.7125

**Table 3. Police Talkgroups**

| *Decimal* | *Description* |
|---|---|
| 10002 | Dispatch Districts 1 & 2 |
| 10003 | Dispatch District 3 |
| 10004 | Dispatch Districts 4 & 5 |
| 10006 | Dispatch Districts 6 & 8 |
| 10007 | Dispatch District 7 |
| 10008 | Dispatch District 9 |
| 10001 | South Info A |
| 10005 | North Info B |
| 10012 | Tactical A |
| 10013 | Tactical B |
| 10014 | Tactical C |
| 10009 | Air |
| 10011 | Special Operation Deployment Division |
| 10019 | Mobile Reserve & K9 |
| 10023 | Traffic & Miscellaneous Operations |
| 10024 | South Patrol |
| 10027 | Narcotics & Vice |
| 10029 | North Patrol |
| 10030 | Units to Disptacher |
| 20000 | Citywide |


## St. Louis Analog Trunked System

The older, analog system used to host all city services except for the fire department. The city's police department has moved to the new digital system.


*Jefferson National Expansion Memorial (official name of park where the Arch lives)*

**Table 4. Analog TRS frequencies**

856.4375
856.4875
857.4375
857.4625
858.4375
859.4375
859.4625
860.4375
860.4625
860.4875

**Table 5. Analog TRS talkgroups**

St. Louis City Sheriff's Department

| *Decimal* | *Description* |
|---|---|
| 58608 | Sheriff Dept |
| 58640 | Sheriff Dept (Ex-Parte Orders) |

**St. Louis EMS Department**

| *Decimal* | *Description* |
|---|---|
| 58416 | EMS Dispatch |
| 58448 | EMS 2 |
| 58480 | EMS 3 |
| 58544 | EMS 4 |
| 59472 | EMS Detail |

**St. Louis Emergency Management Agency**

| *Decimal* | *Description* |
|---|---|
| 58512 | Emergency Management Agency |

## St. Louis Fire Department

The St. Louis Fire Department protects 350,000 residents who live inside the city's 62 square miles. The department employs around 900 personnel, which includes firefighters, EMTs, paramedics, and civilians. The department provides support at St. Louis' Lambert International Airport and maintains a marine operations division along the Mississippi River.

**Table 6. St. Louis Fire Department frequencies**

| *Frequency* | *CTCSS* | *Description* |
|---|---|---|
| 154.1300 | 203.5 Hz | Dispatch - Base to Mobiles |
| 154.0100 | 203.5 Hz | Dispatch - Mobiles to Base |
| 154.2800 | CSQ | Statewide Mutual Aid |
| 153.8300 | 203.5 Hz | Command A |
| 155.3250 | 203.5 Hz | Command B |
| 154.2650 | 203.5 Hz | Command C |
| 154.2950 | 203.5 Hz | Command D |
| 153.9500 | 203.5 Hz | Command E |
| 460.1750 | 351 DPL | Simulcast of 154.130 MHz |
| 453.4625 | | Remote Link 1 |
| 453.7375 | 203.5 Hz | Remote Link 2 |
| 458.4625 | | Remote Link 3 |
| 458.7375 | CSQ | Remote Link 4 |
| 460.5875 | CSQ | Remote Link 5 |
| 460.6125 | | Remote Link 6 |
| 460.6375 | | Remote Link 7 |
| 465.5875 | 203.5 Hz | Remote Link 8 |
| 465.6125 | | Remote Link 9 |
| 465.6375 | | Remote Link 10 |

## Farewell from the Gateway City

We certainly hope you enjoyed your visit to the Gateway City to the West. Many great Americans have passed through St. Louis and hopefully you'll soon have the opportunity to do the same.

MT


***St. Louis is truly the crossroads of America with a number of Interstate highways running through the city.***

*Ken Reitz, KS4ZR*
*kenreitz@monitoringtimes.com*

# Shopping for a SW Radio, Useful Spam, Ham Radio Scholarships

MT reader Mike Dice was in the market for a new shortwave radio. He wrote that he listened primarily to the 49, 41 and 31 meter bands, and sometimes 40 meter CW. He also wrote, "I use a Hallicrafters S-38B, a Knight R-55A and a Kaito KA1101. For the tube radios I use a fan dipole (40 and 30 meters) which lies on top of my roof. For the Kaito I just use the telescopic whip as the front end is overloaded with AM broadcast on the dipole. All three get about the same reception. I am considering replacing them all with a Ten-Tec 1254. Is there a big difference in performance from my current radios to the 1254? I like the digital dial and compact size as well as Ten-Tec's good reputation."

Mike, the first thing you need to do is ask yourself what your shortwave listening goal is. If you're looking for kit-building experience and are handy with a soldering iron this could be a rewarding project. But, if you're looking for a shortwave receiver that outperforms the ones you already have, this is probably not what you need.

To find out what the real-life experience has been with the Ten-Tec 1254, which sells for just under $200, I went to **eham.net** and checked out the on-line reviews. The ratings varied wildly. Those who had a strong engineering background enjoyed building the kit, but those who did not ended up very frustrated. Comments from those who had built the kit also indicated that it was not a particularly easy set to use. I also noted on the Ten-Tec web page that the 1254 was a very basic receiver, compared to more expensive triple conversion, phase-locked loop sets on today's market.

I would like to suggest some other alternatives to the 1254 for shortwave listening. The Drake SW8, though no longer made, has a good reputation but commands a stiff price (about $500) when they come up for sale used. Icom's R-75 is said to be a great receiver and it's currently in production, but at $600, it's nearly three times the cost of the 1254. However, I did find a used R-75 at Universal Radio (**www.universal-radio.com/text/used.txt**) for around $400. While I can't imagine that you'd want to divest yourself of your tube-fired radios, their sale might allow you to buy a new R-75 without digging into the piggy bank if you found the right collector. Those old radios are always in demand.


*Icom's R-75 is the gold standard for inexpensive table-top shortwave radios still produced today. (Courtesy: Icom)*

Another option is the Kaito 1103, a dual-conversion, pocket portable that I personally found to be a great little shortwave set (see my review *MT* April, 2007 pages 68 and 69). At less than half the price of the Ten-Tec 1254 ($90 at Grove Enterprises) you get a versatile shortwave radio without the hassle of putting it together.


*Front and rear views of Ten-Tec's 1254 shortwave radio kit ($195). It's a fun kit for the electronically inclined but, according to e-ham.net, those less handy with a soldering iron found it difficult to build and use. (Courtesy: Ten-Tec)*


*Kaito 1103 portable shortwave radio is inexpensive and a great performer. (Courtesy: Kaito U.S.A)*

## ❖ Spam Worth Reading

Every day I'm asked, as I'm sure you are, to do any number of mind-boggling things from offers received via e-mail. Anyone who thought that e-mail wouldn't eventually deteriorate into a 90% junk formula wasn't familiar with the U.S. Postal Service. But, every now and then a piece of junk mail catches your attention, and next thing you know, you're calling their toll free number to place an order. That's the way it was with Cable Wholesale.com. It's a company that specializes in cable of every size and description offered at prices way below Radio Shack and what's left of the other big electronic retailers – sometimes up to 50% less.

I first found Cable Wholesale some five years ago when I was looking for something I couldn't find anywhere at the time: 50 feet of high-quality HD video cables to go from an HD converter to the back of an HDTV set that was a good 30 feet away. Allowing for an 8 foot run up the wall and an 8 foot run down the wall 30 feet away, I couldn't use anything less than the best grade cable. But, the most any of the other retailers (Radio Shack, Circuit City, Best Buy and others) had at the time was 25 feet. A Google search turned up Cable Wholesale which carried the 50-ft cable for less cost than most sold the 25-ft cable. Since then, I've gone to them for all manner of cable (audio, video, RCA, S-video, fiber optic cable) and have been a satisfied customer.

When I made my first purchase, I gave them my e-mail address to track the shipment. Of course, like most companies today, Cable Wholesale used my e-mail address so they could continue to send me "updates," a euphemism for spam. But, what Cable Wholesale sends are technical articles about everything connected with cables (if you'll pardon the pun). The series dates back to August 2003, and while not exactly monthly, there are 21 covering topics such as HDMI, fiber optic, video and audio cables. These articles are particularly useful for beginners.

In April of this year the subject was an update concerning USB cables, covering their history, the various types and applications, as well as a look at their limitations. The article

detailed other common problems with USB cables and their solutions. I also found out that a new USB 3.0 cable was in the works for release next year that would be able to carry 10 times the speed of the current USB 2.0 cables. It was truly spam worth reading.

The best part is that you don't have to sign up to receive these articles – you can simply go here and read them all: **www.cablewholesale.com/?section=Support&body=Technical_Articles** Of course, while you're at their web site, you may just check out the prices for some of the cables you regularly use. I found that even with shipping, the prices were considerably cheaper than any other source.

## ❖ Importance of Kids in Radio

The current myth is that today's generation of kids aren't interested in radio. They're too busy Twittering, Googling, texting, rapping and slacking to be involved in something so 20th century. This myth also provides an easy way for radio hobby parents, who can't seem to motivate their own children into the hobby, to cop out. What's the difference if your kids aren't interested in radio? Why bother helping to set up a ham radio club in one of your area's schools? Kids today would rather spend time on Facebook than working on their logbook, wouldn't they?

As this is being written, the ARRL Foundation has just announced their 2009 Scholarship recipients. The League announced that they have awarded 52 scholarships to students in 21 states totalling $54,700 this year. The big scholarship, the William R. Goldfarb Memorial Scholarship, was awarded earlier to a Wilson High School (Long Beach, California) senior, Dean LaBarba, who will receive $10,000 a year for four years.

The Washington, DC-based Foundation for Amateur Radio (FAR) administers 48 scholarships for clubs, individuals and other radio related organizations apart from the ARRL. These include Young Ladies' Radio League (YLRL), Quarter Century Wireless Association, 10-10 International, Radio Club of America and a dozen more. Scholarship awards range from $500 to $5,000 each.

In addition, many locally funded scholarships are found throughout the country for local students only, such as the Austin Amateur Radio Club's Copeland Scholarship awarded to local students who are licensed amateurs (**www.austinhams.org/copeland.htm**). The Rochester Amateur Radio Association (RARA) offers memorial scholarships to students who are RARA members and New York state residents (**http://rochesterhamfest.org/Scholarship.htm**).


***ARRL Foundation Scholarship Program: Helping educate the next generation. (Courtesy: ARRLF)***

Once in college, there's a chance for continued scholarship aid. For example, the Michigan State University's Gerald and Lois Park Amateur Radio Endowed Scholarship Fund can provide $4,000 to an MSU engineering student active in the MSU Amateur Radio Club. You can find a list of ARRL Foundation scholarships, including the ARRL scholarship honoring Barry Goldwater K7UGA ($5,000) here: **www.arrlf.org/programs/scholarships**.

Here's a little secret about amateur radio scholarships: compared to most other scholarships, there's not a lot of competition for them. The chances of your child winning are pretty good. In many cases, all the student has to do is get a Technician Class ticket and, just like, that they're in a select group of students who qualify for those scholarships. Sure, most scholarships are small ($500-$1,000), but these days every bit helps. And, there's something to be said about the honor of going to school with funds, no matter how great or small, raised by hams who want to help keep the hobby going.

So, how can you help? If you have a child between the ages of five and 18 get them interested in your hobby. Show how computers have helped change the way hams communicate. Demonstrate, if you can, how digital modes such as PSK31, RTTY, SSTV, Olivia, MFSK and others work. Show how hams can use electronic keyers to send old-time Morse code (CW). Show how software can decode poorly sent CW even under weak reception conditions. If you can't demonstrate digital modes, learn. It's so easy even a… well, you know the rest.

If your children are grown up and you missed doing this the first time around, you may have grandchildren now or on the way that you can teach. If you don't have grandchildren, there are schools in your area that need help getting an amateur radio club started. If you don't know where to start, try your local ham club, they may have such a program in place. If they don't, start one yourself.

If you won't teach your own kids or grandchildren or help local kids or donate your time at your local club, at least donate some of that surplus gear. Instead of putting it on eBay for a couple of bucks, give it away locally.

And, finally, if you can't do anything else, write a check. Send your donation to the ARRL Foundation or FAR or your local club's scholarship fund. If you can't find a fund to give money to, start your own. Just about any attorney can draw up the papers to start such a scholarship fund. This kind of thing is like a boulder sitting on a mountain side. It could stay there forever until someone or something pries it loose. Then it has a momentum all its own.

*Loyd Van Horn, W4LVH*
*loydvanhorn@monitoringtimes.com*

# Happy Birthday, America!

Few things evoke the imagery of summer for Americans quite like celebrating the 4th of July. Further, there may be no more fitting way of celebrating American independence than taking part of the festivities in Washington D.C. But what does a cash-strapped, would-be traveler do in economic times like these?

How about tuning in the patriotic hoopla right from the comfort of your own home?

No need to fight the crowds on the Mall or worry about getting through security – not when there are plenty of options online to bring the events to you.

In addition to the standard coverage of parades and fireworks, big events like July 4th have the potential to encompass breaking news events as well. Should a story break, having a few key web sites will be crucial for the streaming fan looking to soak up information from the scene.

## ❖ Radio

For such a tiny area, Washington D.C. and its surrounding area boast quite a few radio stations. As can be expected in America's Capital city, news/talk format stations are plentiful, and these will probably be where you want to stop first for coverage of 4th of July festivities and any breaking news to come from the events.

The big gun for news/talk in the District is WFED 1150-AM. On the East Coast, WFED is a 50,000 watt powerhouse for news and information from the nation's capital. Those looking for coverage of July 4th events should likely start here first, especially near the top of the hour.

WFED touts itself as Federal News Radio, but for more than 50 years it carried the call letters WTOP. "Federal News Radio" actually started as an Internet-only stream before becoming the first station in the country to make the move *from* Internet *to* terrestrial broadcasts in 2006.

The famous WTOP call letters are now being simulcast on two stations: 1050-AM and 103.5-FM. These stations also carry news/talk formats and are part of a greater "WTOP Radio" network of repeaters and simulcast stations.

In addition to WFED, Washington D.C. has a few other well-known stations for news and talk. Stations like the historic stations WOL 1450-AM and WMAL 630-AM carry breaking news and information to targeted audiences.

WMAL is one of the oldest stations in D.C., with broadcasts beginning in 1925. In addition to syndicated programming from talk-show programming such as Sean Hannity and Rush Limbaugh, WMAL also has in-depth coverage of local news and stories.

WOL is most famous for being the former home of Petey Greene. Greene became one of the most prominent on-air personalities in Washington D.C. and was the springboard for future radio "jocks" like Howard Stern. Today, WOL is the flagship station for Radio One Broadcasting, a 69 station network that targets African Americans in urban areas. For their terrestrial broadcast, WOL broadcasts news and talk with an urban theme.

But stations that are based from within the confines of the District are not the only good sources for information on July 4th festivities and breaking news. Stations like WJFK 106.7 FM in Manassas, VA still serve the D.C. area and would be good sources of information for events and news of celebrations.

## ❖ Television

In addition to the several news/talk radio stations, Washington has several major television stations, several of which serve as cornerstones of their respective networks.

One such example is NBC's WRC-TV. WRC's web site has a large selection of local news and programming information, and should have plenty of information on July 4th festivities in and around the D.C. area.

Other major stations in the D.C. area include WTTG – FOX 5, WJLA – ABC 7, and WUSA – CBS 9. Each station's web page has a variety of both text and multimedia breaking news and event stories. Any of these pages would be good sources of information should breaking news happen.

## ❖ Streaming Scanner Feed

Don't want to wait for radio or television stations to think of how they are going to cover the celebrations or breaking news? A good source for up-to-the-minute action is streaming scanner feeds from scanner enthusiasts right in the D.C. area.

Perhaps the best on the Net for the D.C. area is DC Fire Feed. Users will have to download the latest edition of TeamSpeak in order to tune in the streams, but once you are up and running, connecting to the DC Fire Feed server is a breeze. Word of advice. though: you may want to disable the sound notifications because they can be a bit of an annoyance and distract from your listening.

For the prepared streaming hobbyist, July 4th from the streets of D.C. should offer a whole new perspective on America's birthday bash.

## ❖ Radio Performance Bill Coming Closer?

Although it is starting to garner fierce opposition from a growing number of lawmakers, as of press time the Radio Performance Bill was closer to coming to fruition.

The Recording Industry Association of America (RIAA), led by recording artists such as Bono, are pushing Congress to impose royalties on terrestrial broadcasters for playing

songs on their stations. They claim that for far too long, broadcasters have made fortunes in advertising revenue by using popular music as a product, and the artists haven't gotten a large enough cut.

While radio stations have for years paid fees to songwriting publishing companies such as BMI and ASCAP, this new royalty would be paid to artists directly.

The bill, H.R. 4789, was introduced in the House by Rep. Howard Berman [D, CA-28] and has 22 sponsors after it passed a House Judiciary Committee vote by a 21 to 9 margin. The bill is now being introduced to a full House vote, but there is growing opposition in the House, thanks to a push by the National Association of Broadcasters (NAB).

The NAB has garnered the support of nearly 200 House members under what they are calling the Local Radio Freedom Act to oppose H.R. 4789. The non-binding resolution calls for a stop to any further royalties being imposed on broadcasters for performance (playing of songs).

In addition to the added expense to larger broadcasters, there is concern that such a bill would devastate the smaller regional or locally-owned radio stations. While there is a provision in the bill for a flat fee for those stations earning under a certain amount of advertising revenue per year, there are some that still feel the added expense would push smaller stations beyond the point of being able to sustain their operations.

What does this mean for the streaming radio fan? The opinions on this vary. There are some who feel that in order to keep their terrestrial broadcasts on the air, stations will have to pull their Internet streams to cut costs. While some stations are finding ways to incorporate Internet advertising into their revenue sources, few have been able to do so with great success.

Still, some say it may lead to a wave of broadcasters flooding to the Internet as a low-cost alternative to 24-hour terrestrial operation. In order to cut operational and payroll costs, some feel that some stations would amend their licenses to operate less than 24-hours, yet keep their streams running full-time.

Whichever way it goes, it will be interesting to see what affect, if any, this has on Internet streaming.

## ❖ Got the whole world of music, in my hands

I told you in a previous column about the Pandora streaming music service. While technically not a streaming radio station, Pandora allows music fans to create their own custom "radio stations" based on favorite songs or artists. The Pandora service will then look at hundreds of variables pinpointing a users' musical tastes to find other artists and songs that they might enjoy, thus programming their own personal "radio station."

For a while, Pandora was only accessible on your computer or through a handful of Internet radios. Then a new application was introduced for iPhone users, allowing them to stream their stations through their phones.

Now Blackberry has jumped on board with


a Pandora application. I recently downloaded the app to my Blackberry Curve and have been enjoying the results.

Not only does it allow you to stream your stations you have already created, but it also incorporates the other Pandora functions that users have grown accustomed to. On your Blackberry you can give songs a "thumbs up" or "thumbs down," which further refines your musical preferences for Pandora to use when finding other songs for your station. You can also create new stations on your Blackberry as well.

Those of you who have smartphones, such as the Blackberry and iPhone, might want to do some searching. In recent months a few other streaming radio applications have also become available, allowing users to stream their favorite radio stations on their phones.

### GLOBALNET LINKS

**Radio**
WFED 1500-AM – **http:// federalnewsradio.com**
WMAL 630-AM – **www.630wmal.com**
WOL 1450-AM – **http://wolam.com**
WJFK 106.7 FM – **www.wjfk.com**

**TV**
WRC TV-4 – **www.nbcwashington.com**
WTTG TV-5 – **www.myfoxdc.com**
WJLA TV-7 – **www.wjla.com**
WUSA TV-9 – **www.wusa9.com**

**Scanning**
D.C. Fire Feed – **www.dcfirefeed.com**

**In the news**
H.R. 4789 - **www.opencongress.org/bill/110-h4789/show**
Local Radio Freedom Act – **www.noperformancetax.org**
Pandora – **www.pandora.com**

*Dan Veeneman*
*danveeneman@monitoringtimes.com*
***www.signalharbor.com***

# Scanning Rochester and San Diego

Selecting a scanner and finding the proper frequencies for it are common tasks for any listener. This month we examine two metropolitan systems and take a closer look at how crowding is driving greater efficiency in the radio spectrum.

## ❖ Rochester, NY

*I just acquired a Radio Shack PRO-2052 and would like to install Rochester, New York airport and aircraft frequencies, fire department and emergency frequencies. Do you know those frequencies?*

*Jay via the Internet*


The Radio Shack PRO-2052 is a base model scanner introduced at the end of 1999. It was actually built by Uniden and is capable of tracking Motorola and EDACS trunked radio systems as well as analog conventional transmissions. The scanner can be programmed manually through the keypad or remotely via software on a personal computer.

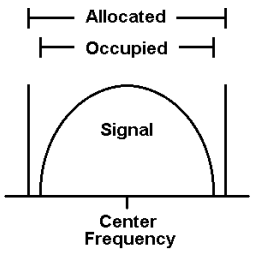
Rochester is a city in New York of just over 200,000 people located on the southern shore of Lake Ontario in Monroe County. The Genesee River runs through the city. Several famous companies got their start in the Rochester area, including Eastman Kodak, Western Union, and Xerox Corporation. Late night computer programmers may also recognize Rochester as the home of Wet Planet Beverages, the maker of Jolt brand cola.

There is another New York town named Rochester, in the middle of Ulster County, that is home to about 7,000 residents, but I'm presuming Jay is interested in the larger city.

## ❖ Bandwidth

You may notice something a little unusual about a few of the frequencies listed below. Monroe County is using what are called *narrowband* channels for some police and fire department operations.

When you program a radio frequency into your scanner, what you're doing is telling the scanner the *center frequency* of the channel. This is where the scanner will tune to when you wish to listen to that channel. Each channel that you program also has a particular *bandwidth*, which is a number that describes the amount of spectrum taken up by that channel. Like frequency, bandwidth is measured in Hertz (or cycles per second for those folks that have been around for a while), although we more commonly use multiples of a thousand (kilohertz, abbreviated as kHz) or a million (megahertz, abbreviated as MHz) to describe specific values.




A channel will have two bandwidth measurements. The first is called *allocated bandwidth*, which is the amount of spectrum licensed for it to use. The Federal Communications Commission (FCC) controls frequency allocation for non-government use in the United States and makes the final decision about allocated bandwidths. The second measurement is called *occupied bandwidth*, which is the amount of spectrum that actually carries useful information during a transmission. Occupied bandwidth is smaller than the allocated bandwidth, and the remaining "unused" bandwidth provides a buffer zone between two adjacent channels.

In a perfect world, you wouldn't need these buffer zones. However, as you might have noticed, we don't live in a perfect world. Radios have to be built from real parts that actually exist. These parts have side effects and characteristics that don't always match mathematical models. Filters don't filter perfectly. Oscillators generate unwanted harmonics. Crystals age and depart from their original frequency. Cost drives many manufacturing decisions, so compromises are made in the design to make the radio affordable.

These compromises ultimately affect the stability and accuracy of transmissions. Buffer zones, sometimes called "guard bands," are intended to take all of these issues into account and help avoid interference between one signal and another.

Most public safety radios transmit a signal using frequency modulation (FM). The occupied bandwidth of these signals depends on a number of factors, including the amount of information in the signal and the level of quality in the radio hardware itself. When transmitting sound, the amount of information in the signal is related to how accurately the sound can be reproduced at the receiver – sometimes called *fidelity*. Getting more fidelity at the receiver generally requires more bandwidth. For instance, commercial FM radio broadcasts use 150 kHz of spectrum to bring you relatively good quality stereo sound. Public safety radios, which deliver much lower fidelity, use far less bandwidth.

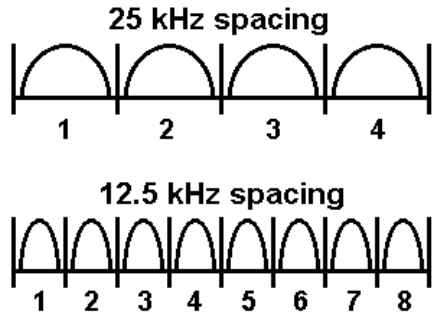
As an aside, FM broadcast stations are legally allocated 200 kHz of spectrum. While the signal occupies 150 kHz, the remaining 50 kHz (25 kHz at the low end and another 25 kHz at the high end) provides a buffer to reduce potential interference between stations.

## ❖ Narrowbanding

In 1995, the FCC recognized the crowded nature and growing demands in the VHF and UHF bands. They created a rather complicated "refarming" plan to add additional channels in the existing bands by establishing new center frequencies and smaller channel bandwidths. They enforced this plan by requiring equipment manufacturers to produce better radios that could transmit reasonable sound in those narrower bandwidths. At that time, the majority of equipment used "standard" (now called "legacy") channels with a bandwidth of 25 kHz.

The new rules counted on technological advances to allow radios to operate properly on channels that had only a 12.5 kHz allocated bandwidth. Better filters, component improvements, and tighter quality control made it possible for manufacturers to build radios that transmitted signals with reduced occupied bandwidth. The end result is more users in the same amount of spectrum.

In 2003, the FCC revisited these "narrowband" rules and eventually set a 10-year deadline for all affected radio systems to switch over. By January 1, 2013 all existing public safety radio



users (as well as those industrial and business users in the same frequency ranges) in the allocated VHF and UHF bands must have converted to the more efficient 12.5 kHz equipment.

Rochester and Monroe County use conventional (non-trunked) VHF and UHF frequencies for public safety, based out of a facility at the top of Cobbs Hill. The PRO-2052 should be more than sufficient to monitor activity in this area.

| Frequency | Description |
|---|---|
| 47.58 | Rural Metro Ambulance (Dispatch) |
| 153.830 | City and County Fire (Portables) |
| 154.1075 | Fire/EMS First Battalion Operations |
| 154.130 | City Fire (Dispatch) |
| 154.175 | County Fire (West Fireground) |
| 154.250 | City/County Fire (Operations) |
| 154.310 | County Fire (Dispatch) |
| 154.340 | County Fireground |
| 154.385 | County Fire (East Fireground) |
| 154.830 | City Fireground |
| 155.0025 | Fire/EMS Fourth Battalion Operations |
| 155.175 | County Emergency Medical Services (Mutual Aid) |
| 155.220 | Emergency Medical Service (East Operations) |
| 155.2575 | Fire/EMS Second Battalion Operations |
| 155.280 | Hospital to Hospital |
| 155.295 | County Emergency Medical Services (Dispatch) |
| 155.3175 | Fire/EMS Fifth Battalion Operations |
| 155.340 | EMS to Hospital |
| 155.3925 | Fire/EMS Mutual Aid |
| 155.400 | Hospital to Hospital |
| 155.820 | Fire Police |
| 156.2325 | Fire/EMS Third Battalion Operations |
| 166.250 | Emergency Alert System |
| 460.0250 | City Police (East Dispatch) |
| 460.0500 | Sheriff (Corrections) |
| 460.0500 | City Police (Tactical Portables) |
| 460.0750 | Sheriff (North Dispatch) |
| 460.1000 | County Jail |
| 460.1250 | City Police (West Dispatch) |
| 460.1500 | Sheriff (Security) |
| 460.1750 | Sheriff (East Dispatch) |
| 460.1875 | Sheriff (Tactical) |
| 460.2000 | City Police (West Administration) |
| 460.2250 | Sheriff (North Dispatch) |
| 460.2500 | Sheriff (West Tactical) |
| 460.2625 | Sheriff (Tactical) |
| 460.2750 | Sheriff (Airport Division) |
| 460.2875 | Sheriff (Tactical) |
| 460.3000 | Sheriff (West Dispatch) |
| 460.3250 | Sheriff (Tactical) |
| 460.3250 | City Police (Tactical) |
| 460.3750 | Sheriff (East Tactical) |
| 460.4000 | Sheriff (Administration) |
| 460.4500 | City Police (East Administration) |
| 460.4750 | Sheriff (Dispatch) |
| 460.5000 | City Police (Car-to-Car) |

Rochester has airline service from the Greater Rochester International Airport (GRIA), which is located about four miles southwest of the city. It serves about three million passengers each year with more than 100,000 aircraft operations (takeoffs and landings) from commercial, military, corporate and general aviation. The GRIA Aircraft Rescue and Firefighting (ARFF) unit is staffed by two dozen career firefighter/paramedics and responds to about 500 calls for service each year.

The airport is assigned the Federal Aviation Administration (FAA) airport identifier KROC and is within the control area of Cleveland Center.

| Description | Frequency |
|---|---|
| UNICOM | 122.950 |
| ATIS | 124.825 |
| Weather ASOS | 124.825 |
| Ground Control | 121.700 |
| Tower | 118.300 and 254.300 |
| Approach (330 to 160) | 119.550 and 269.600 |
| Approach (161 to 329) | 123.700 and 322.300 |
| Departure (330 to 160) | 119.550 and 269.600 |
| Departure (161 to 329) | 123.700 and 322.300 |
| Departure | 127.325 |
| Clearance Delivery | 118.800 and 387.000 |
| Pre-Taxi Clearance | 118.800 and 387.000 |
| As Assigned | 125.95 |
| Class C (330 to 160) | 119.550 and 269.600 |
| Class C (161 to 329) | 123.700 and 322.300 |
| Emergencies | 121.500 and 243.000 |

The ATIS (Automated Terminal Information Service) is a continuous broadcast of weather, runway, and other information related to the airport that is of interest to a pilot. It will have a one-word identifier taken from the phonetic alphabet (for example, "kilo") and a time indication (based on Greenwich Mean Time and referred to as "Zulu"). Pilots will listen to this broadcast to learn current weather conditions at the airport, active and closed runways, and any special procedures to arrive at or depart from the airport.

Rochester is equipped with an Automated Surface Observing System (ASOS), which is a self-contained mechanism for weather observation and reporting. Information includes temperature, atmospheric pressure, wind speed and direction, precipitation, icing, visibility and other local weather characteristics. Some of these data are included in the ATIS broadcast and are also available on the World Wide Web from the National Weather Service at **http://weather.noaa.gov/weather/current/KROC.html**.

## ❖ San Diego, California

*I am new to scanners. What model and manufacturer of handheld scanner would you recommend? I live in San Diego and would like to monitor primarily police frequencies. I would also like to have the ability to log onto different cities' frequencies when I travel, but not as important. Thanks for your suggestions.*

*Rick in California*

San Diego is a city and a county in southern California, bordering Mexico and the Pacific Ocean. The city is home to more than 1.3 million residents, with about three million people in the larger metropolitan area.

The City of San Diego operates a Motorola Type II trunked radio system on the following frequencies: 856.0250, 856.0500, 856.0750, 857.0000, 857.0250, 857.0500, 858.0000, 858.0250, 858.0500, 859.0000, 859.0250, 859.0500, 860.0000, 860.0250, 860.0500, 862.0500, 862.1000, 863.0500, 864.0500 and 865.0500 MHz.

Voice activity on the city system is a combination of analog and APCO Project 25 digital, so you will need a scanner capable of digital operation.

Police talkgroups include:

| Decimal | Hex | Description |
|---|---|---|
| 208 | 00D | North Dispatch 1 |
| 272 | 011 | North Dispatch 2 |
| 368 | 017 | Inquiries |
| 432 | 01B | Tactical 1 |
| 528 | 021 | Tactical 2 |
| 592 | 025 | Tactical 3 |
| 688 | 02B | Tactical 4 |
| 752 | 02F | Tactical 5 |
| 848 | 035 | Tactical 6 |
| 912 | 039 | Tactical 7 |
| 1008 | 03F | City Tactical 1 |
| 1072 | 043 | City Tactical 2 |
| 1104 | 045 | City Tactical 3 |
| 1296 | 051 | South Dispatch 1 |
| 1360 | 055 | South Dispatch 2 |
| 1456 | 05B | East Dispatch 1 |
| 1520 | 05F | East Dispatch 2 |
| 1616 | 065 | Western Dispatch 1 |
| 1680 | 069 | Western Dispatch 2 |
| 1776 | 06F | Central Dispatch 1 |
| 1840 | 073 | Central Dispatch 2 |
| 1936 | 079 | Northeast Dispatch 1 |
| 2000 | 07D | Northeast Dispatch 2 |
| 2096 | 083 | Southeast Dispatch 1 |
| 2160 | 087 | Southeast Dispatch 2 |
| 2256 | 08D | Mid-City Dispatch 1 |
| 2320 | 091 | Mid-City Dispatch 2 |
| 2416 | 097 | North City West Dispatch 1 |
| 2480 | 09B | Police North City West Dispatch 2 |
| 2576 | 0A1 | SWAT 1 |
| 2608 | 0A3 | SWAT 2 |
| 2736 | 0AB | Narcotics 1 |
| 2800 | 0AF | Narcotics 2 |
| 2896 | 0B5 | Narcotics 3 |
| 3216 | 0C9 | California Highway Patrol (Mutual Aid) |
| 3280 | 0CD | San Diego Sheriff's Office (Mutual Aid) |
| 3344 | 0D1 | Other Mutual Aid |
| 3376 | 0D3 | Border Patrol (Mutual Aid) |
| 3408 | 0D5 | Border 1 |
| 3440 | 0D7 | Border 2 |
| 3472 | 0D9 | Border 3 |
| 3568 | 0DF | Internal Affairs 1 |
| 3600 | 0E1 | Internal Affairs 2 |
| 3696 | 0E7 | Criminal Investigation Unit |
| 3792 | 0ED | Special Investigation Unit 1 |

| | | |
|---|---|---|
| 3824 | 0EF | Special Investigation Unit 2 |
| 4080 | 0FF | Narcotics Task Force |
| 4176 | 105 | Vice 1 |
| 4208 | 107 | Vice 2 |
| 4272 | 10B | Emergency Negotiating Team |
| 4336 | 10F | Gangs |
| 4432 | 115 | Robbery |
| 4496 | 119 | Parking Enforcement (Dispatch) |
| 15568 | 3CD | Events Dispatch 1 |
| 15600 | 3CF | Events Dispatch 2 |
| 47312 | B8D | Parking Enforcement Tactical 1 |
| 47344 | B8F | Parking Enforcement Tactical 2 |
| 47376 | B91 | Parking Enforcement Tactical 3 |
| 48144 | BC1 | Investigations Tactical (Calling) |
| 48176 | BC3 | Investigations Tactical 1 |
| 48208 | BC5 | Investigations Tactical 2 |
| 48240 | BC7 | Investigations Tactical 3 |
| 48272 | BC9 | Investigations Tactical 4 |
| 48304 | BCB | Investigations Tactical 5 |
| 48336 | BCD | Investigations Tactical 6 |
| 48368 | BCF | Investigations Tactical 7 |
| 48400 | BD1 | Investigations Tactical 8 |
| 48432 | BD3 | Investigations Tactical 9 |
| 48464 | BD5 | Investigations Tactical 10 |
| 48496 | BD7 | Investigations Tactical 11 |
| 48528 | BD9 | Investigations Tactical 12 |
| 48560 | BDB | Investigations Tactical 13 |
| 48816 | BEB | Command 1 |
| 48848 | BED | Command 2 |
| 48880 | BEF | Command 3 |
| 48912 | BF1 | Command 4 |
| 48944 | BF3 | Command 5 |
| 48976 | BF5 | Command 6 |
| 49008 | BF7 | Command 7 |
| 49040 | BF9 | Command 8 |

Fire and Emergency Medical Service talkgroups include:

| Decimal | Hex | Description |
|---|---|---|
| 4688 | 125 | Fire Dispatch (Simulcast) |
| 5008 | 139 | Fire Dispatch |
| 5168 | 143 | Fire Administration |
| 5232 | 147 | Advanced Life Support (Dispatch) |
| 5328 | 14D | Command 7 (Metro Command) |
| 5392 | 151 | Tactical 24 (Metro Primary) |
| 5488 | 157 | Command 8 (Citywide and San Pasqual) |
| 5552 | 15B | Tactical 7 |
| 5648 | 161 | Tactical 5 |
| 5712 | 165 | Tactical 16 (Battalion 1 Training) |
| 5808 | 16B | Tactical 6 |
| 5872 | 16F | Tactical 22 (Fires, North of I-8 and Poway) |
| 5968 | 175 | Command 6 (Fires, North of I-8 and Poway) |
| 6032 | 179 | Tactical 23 (North of I-8 and Poway) |
| 6128 | 17F | Tactical 26 (Citywide and San Pasqual Primary) |
| 6288 | 189 | Tactical 9 |
| 6352 | 18D | Tactical 20 |
| 6448 | 193 | Tactical 3 (Traffic Accidents and Grass Primary) |
| 6512 | 197 | Command 2 (Traffic Accidents and Grass Command) |
| 6608 | 19D | Tactical 4 (Traffic Accidents and Grass Secondary) |
| 6672 | 1A1 | Tactical 21 |
| 6768 | 1A7 | Tactical 10 (Fires, South Bay) |
| 6832 | 1AB | Command 3 (Fires, South Bay) |
| 6928 | 1B1 | Tactical 11 (South Bay) |
| 6992 | 1B5 | Tactical 28 (Battalion 3 Training) |
| 7088 | 1BB | Tactical 14 (Fires, East of I-805 and South of I-8) |
| 7152 | 1BF | Command 5 (Fires, East of I-805 and South of I-8) |
| 7248 | 1C5 | Tactical 15 (East of I-805 and South of I-8) |
| 7312 | 1C9 | Tactical 17 (Battalion 2 Training) |
| 7408 | 1CF | Tactical 1 (Medical Primary Tactical) |
| 7472 | 1D3 | Command 1 (Medical) |
| 7568 | 1D9 | Tactical 2 (Medical Secondary Tactical) |
| 7632 | 1DD | Tactical 18 (Battalion 4 Training) |
| 7728 | 1E3 | Tactical 12 (Fires, West of I-805 and South of I-8) |
| 7792 | 1E7 | Command 4 (Fires, West of I-805 and South of I-8) |
| 7888 | 1ED | Tactical 13 (West of I-805 and South of I-8) |
| 7952 | 1F1 | Tactical 19 (Battalion 6 Training) |
| 8112 | 1FB | Tactical 32 |
| 8208 | 201 | Basic Life Support Medical (Dispatch) |
| 8272 | 205 | Tactical 25 (Metro Secondary Tactical) |
| 8368 | 20B | Tactical 33 |
| 8432 | 20F | Tactical 8 |
| 8528 | 215 | Tactical 27 (Citywide and San Pasqual Secondary) |
| 8592 | 219 | Tactical 29 (Battalion 5 Training) |
| 8688 | 21F | Tactical 30 (Battalion 7 Training) |
| 8752 | 223 | Tactical 31 |
| 9360 | 249 | Basic Life Support Medical (Administration) |

San Diego County is part of the Regional Communication System (RCS), which provides voice and data services to more than 200 agencies in San Diego and Imperial Counties. RCS is a complex system spread across more than a dozen geographic coverage zones, each of which is assigned a set of frequencies in the 800 MHz band. It uses technology directly compatible with the City of San Diego, meaning it is a Motorola Type II trunked system with a mixture of analog and APCO 25 digital voice traffic.


The southern zone might be of interest to Rick, which operates on the following frequencies: 866.0375, 866.1375, 866.4125, 866.4375, 866.6375, 866.8875, 866.9125, 867.0625, 867.1375, 867.3875, 867.4125, 867.6125, 867.6375, 867.9125, 868.0750, 868.1375, 868.4125, 868.4375 and 868.6000 MHz.

The San Diego County Sheriff's Office makes heavy use of digital voice, so digital capability in a scanner is a necessity to hear their transmissions. Some talkgroups are also encrypted, which puts them out of reach for monitoring. Listed below are a number of active talkgroups that are reported to be unencrypted.

| Decimal | Hex | Description |
|---|---|---|
| 32768 | 800 | Arson/Bomb Squad |
| 32976 | 80D | Administration |
| 33616 | 835 | Criminal Investigations Division 1 |
| 33664 | 838 | Criminal Investigations Division 2 |
| 33680 | 839 | Criminal Investigations Division 3 |
| 33696 | 83A | Criminal Investigations Division 4 |
| 33712 | 83B | Court Services (Dispatch South) |
| 34032 | 84F | SWAT Entry Team 1 |
| 34048 | 850 | SWAT Entry Team 2 |
| 34064 | 851 | Hostage Negotiation Team |
| 34096 | 853 | Homicide 1 |
| 34112 | 854 | Homicide 2 |
| 34208 | 85A | Inquiries (East) |
| 34224 | 85B | Inquiry (North) |
| 34240 | 85C | Inquiry (South) |
| 34464 | 86A | Narcotics 1 |
| 34480 | 86B | Narcotics 2 |
| 34496 | 86C | Narcotics 3 |
| 34592 | 872 | Special Investigations Division 1 |
| 34608 | 873 | Special Investigations Division 2 |
| 34752 | 87C | Special Investigations Division 3 |
| 34768 | 87D | Special Investigations Division 4 |
| 34784 | 87E | Special Investigations Division 5 |
| 35024 | 88D | Commanders' Net |
| 35264 | 89C | Court Services Bureau (South Tactical 1) |
| 35280 | 89D | Court Services Bureau (South Tactical 2) |
| 35296 | 89E | Court Services Bureau (South Tactical 3) |
| 36080 | 8CF | Emergency Communications Training 1 |
| 36096 | 8D0 | Emergency Communications Training 2 |
| 36112 | 8D1 | Emergency Communications Training 3 |
| 36128 | 8D2 | Emergency Communications Training 4 |
| 36512 | 8EA | Internal Affairs 1 |
| 36528 | 8EB | Internal Affairs 2 |
| 37216 | 916 | Task Force (North) |
| 37232 | 917 | Task Force (South) |
| 37248 | 918 | Task Force (East) |
| 37264 | 919 | Task Force (Countywide) |
| 37760 | 938 | Risk Management Unit |
| 37776 | 939 | Court Services (Tactical) |
| 37872 | 93F | Fire Prevention |
| 42736 | A6F | Off-Road Enforcement Team |
| 42752 | A70 | Search and Rescue 1 |
| 42768 | A71 | Search and Rescue 2 |
| 42784 | A72 | Search and Rescue 3 |
| 42800 | A73 | Search and Rescue 4 |
| 42816 | A74 | Search and Rescue 5 |
| 42832 | A75 | Search and Rescue 6 |

If your primary goal is to monitor law enforcement activity in the San Diego area, any scanner that has "digital voice" and trunk-tracking capability will be sufficient. Uniden and GRE are the two leading manufacturers of handheld and base/mobile scanners and are probably the easiest to use for entry-level listeners. Both manufacturers have been building scanners for years and each of their models has a group of enthusiastic users who share their knowledge and experience through Internet interest groups. Once you've settled on a scanner, entering the model number in the search window at **groups.yahoo.com** will give you the opportunity to join a group dedicated to that model.

As a starting point, I maintain a list of trunk-tracking scanners at **www.signalharbor.com/trunking.html** where you can look for digital-capable models (highlighted in yellow).

You'll need to decide whether you want a handheld model that you can carry with you, or a base/mobile model that will stay at home or in your car. Features and capabilities are often similar between the two types, so the choice really depends on how and where you intend to listen.

Certainly if your budget allows, one of the new digital scanner models would provide you with full monitoring capability in San Diego and many other places around the country. However, as a new listener, you may want to consider visiting your local Radio Shack for discontinued or clearance-priced scanners. These models will save you some money and still provide good service. On-line sources of lightly used scanners are also worth checking.

Good luck in your selection, and let us know how things work out!

That's all for this month. You can check my website at **www.signalharbor.com** for more detailed information on scanners, frequencies and other radio-related material. I also welcome electronic mail at *dan.veeneman@monitoringtimes.com*. Until next month, happy scanning!

# ASK BOB

## GENERAL QUESTIONS RELATED TO RADIO

*Bob Grove, W8JHD*
*bobgrove@monitoringtimes.com*

***Q.*** *With the ever-present danger of bird collisions with jet aircraft, why don't they put screens in front of the engines? (MB, Indiana)*

***A.*** The main reason that has been published is that a screen would disrupt the normally smooth airflow, possibly stalling the engine. Another answer is that a thick screen could break upon impact, shedding its pieces into the turbines – not a good thing. And if the screen were stout enough, its weight would impact the lift ability of the engine.

I can think of other reasons as well: Because of the enormous in-draft of air, a wide-spaced mesh would simply suck in the bird in pieces or, if it didn't, the bird would restrict airflow. A fine mesh would either collapse under the pressure, or substantially restrict intake, reducing the plane's ability to fly.

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***Q.*** *I often see antenna gain figures in either dBd or dBi; what is the difference? (Rich, email)*

***A.*** The two ways of expressing antenna gain are dBd (decibels above a dipole) and dBi (decibels above an isotropic antenna. An isotropic antenna is theoretical; it doesn't exist. It's simply a point in space radiating uniformly in all directions.

Since a dipole focuses that same power in specific directions, it has 2.15 dB gain over a dipole. That's why antenna manufacturers like to use dBi as their reference, since virtually any other antenna will have gain over it. But when they compare their antenna to a dipole, they lose 2.15 dB that the dipole has over the imaginary isotropic antenna!

Converting between dBi and dBd is done by simply adding or subtracting 2.15 dB, thus:

dBi = dBd + 2.15, and dBd = dBi - 2.15

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***Q.*** *How long does a wire antenna have to be to be considered a Beverage? How does this affect the directivity of the antenna? (John Bishop, Hawthorne, FL)*

***A.*** By definition, a Beverage antenna is more than a full wavelength, and usually multiple wavelengths, at its frequency of operation. As frequency rises, the wavelength becomes shorter, so a full-wave Beverage at 10 MHz becomes a two-wavelength antenna at 20 MHz.

On any straight wire antenna which is shorter than a wavelength at a given frequency, the major lobes (directional angles off the sides of the wire where it captures the most signal) are at right angles to the wire. As the received frequencies on that wire become progressively higher, their wavelengths become shorter, and more lobes develop which begin to favor the ends of the wire, angling more and more that way as the frequency rises. That's the reason that a multiple-wavelength Beverage aims at targets from its end.

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***Q.*** *I enjoy the air shows, monitoring the Blue Angels, Thunderbirds, Canadian Snow Birds, and even the civilian performers. Am I better off using high-end scanners like the AOR AR8200 MKIII and ICOM IC R-20 over a more conventional Uniden or GRE hand-held? (Steve Walter, email)*

***A.*** Civilian aircraft operate in the 118-137 MHz band, while military aircraft add the 225-400 MHz band, both in AM mode. Any scanner with these frequency ranges will probably suffice for an air show, and will probably exhibit virtually the same sensitivity. The antenna can make a difference; I'd recommend a telescoping whip like the Grove ANT-06 ($14.95); adjust it to about 24" length.

While I have great respect for the extended frequency ranges and functions of the AOR and ICOM hand-helds, the faster scan/search speeds of the Uniden and GRE products can be an advantage in multi-channel communications events like an air show.

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***Q.*** *I have two GRE 3001 VHF preamplifiers; when I connect either to my scanner, I get overload on some signals, producing phantom images on some frequencies, and decreased signal levels on others. How can I be sure that the preamps are not defective, and how can I modify them to reduce the gain? (Sam Brittell, email)*

***A.*** First let's be sure both of the preamps are working properly. Hook the preamp to the scanner antenna jack and attach a short whip (12"-18") to it. Tune in a weak signal like a distant weather broadcast. Now switch the converter off. Does the signal grow weaker or even disappear? If it does, the preamp is working.

There is no intermod/overload "fix" for the preamp; it's been on the market for many years and is well accepted. Chances are the effect is being produced by your scanner rather than the preamp, due to the additional signal strength the preamp is providing. In other words, the scanner is being overloaded, not the preamp.

Try decreasing the voltage on the preamp to reduce its gain; it may work, it may not. Most likely it will. Use a variable-voltage power supply or switchable wall wart for this. With the voltage variability, you would, in effect, have a variable-gain preamp.

Be aware, however, that since the preamp is designed to operate properly on one voltage, the noise level (hiss) may increase as you lower the voltage, or the dynamic range might decrease, causing intermod within the preamp. Only experimenting will disclose this result, and you haven't altered anything in the preamp.

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***Q.*** *Is alternating current (AC) basically the same as direct current (DC) in that electrons move along a conductor? If I were to reverse the leads from a battery to its load 60 times a second, would I have something like AC or would it be simply pulsed DC? (M.B., Indiana)*

***A.*** Electrical current has two primary elements – electrons moving along a wire very slowly, and a wave impulse that travels through the wire at nearly the speed of light. It makes no difference whether we are talking about AC, DC, pulses, square waves or sine waves, the electrons do the same thing; only the timing changes.

If you make/break a battery connection on a circuit, you produce pulsating DC, seen on an oscilloscope as square waves. An AC sine wave, however, is produced by a generator gradually changing its electromagnetic coupling between the spinning rotor coil and the stationary field coil.

The induced current increases gradually from no coupling to maximum coupling, then down again. Half way through its rotation its polarity changes because the rotor coil appears to be moving in the opposite direction in relation to the stationary field coil.

Questions or tips sent to Ask Bob, c/o MT are printed in this column as space permits. Mail your questions along with a self-addressed stamped envelope in care of MT, or e-mail to bobgrove@monitoringtimes.com. (Please include your name and address.)

*Hugh Stegman, NV6H*
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*http://mt-utility.blogspot.com*

# Demystifying STANAG 4285

Few digital modes strike as much fear into the utility fan's heart as the dreaded STANAG 4285. Its self-contained signal and complex configuration can intimidate just about anyone.

Fortunately, reception is possible. It's good, geeky fun, using computer sound card software widely available. You'll never get any important information, but you'll get to see an interesting part of military radio.

## What's in a Name?

STANAG is the abbreviation for "Standardization Agreement" in the North Atlantic Treaty Organization (NATO). Since NATO is a multi-national military alliance, its member nations routinely agree to interoperability standards for every conceivable detail.

***NATO logo. It went out in the right Pantone (280) but I suspect you guys won't see anything close. Can't believe it matters. :-)***

This STANAG, number 4285 in the sequence, is called "Characteristics of 1200/2400/3600 Bits Per Second Single Tone Modulators/Demodulators for HF Radio Links." It's a relatively old (1987) radio modem spec. STANAG 4539 is a newer waveform, but it's not heard nearly as much.

The relevant United States military standard is MIL-STD-188-110B. This wide-ranging document provides a "NATO mode." It specifies STANAG 4285 and 4481 ("Minimum Technical Equipment Standards for Naval HF Shore-to-Ship Broadcast Systems"). You'll also read about a STANAG 5066, which layers a protocol set on top of these modems, and provides a few features missing in 4285.

## Signal Characteristics

STANAG 4285 can be intermittent or continuous, containing many different data types. Most continuous, unencrypted traffic is long-haul, shore-to-ship teleprinting by NATO navies. It usually replaces the slower radio teletype (RTTY).

STANAG 4285's carrier is a single, 1800-hertz (Hz) tone. It is subjected to 8-state phase-shift keying (a mode called 8PSK). In a very strong, properly tuned signal, these eight phases look like a star or flower on the software phase display.

The center frequency and audio offset are therefore 1800 Hz. Overall baud rates vary, but the internal symbol speed is always 2400. Resulting audio goes to an upper sideband (USB) transmitter. The result is a noisy band of energy uniformly filling approximately 2.5 kilohertz (kHz).

A locally generated STANAG 4285 waveform will sound like a steady buzz. However, selective fading in the ionosphere creates the distinctive, jet-plane, whooshing sound. You can usually see this on the waterfall or spectrogram as dark lines moving diagonally through the signal. The larger these are, the worse the fading is, and the less copy will get through.

## Getting Copy

The signal is properly tuned (in wide USB mode) when most of it is between 500 and 3000 Hz. Due to its broadband nature, the radio and audio passbands of the receiver should be as flat as possible. This is a chance for the heavy-duty radios to earn their higher cost. On mine, I usually dial in a bandwidth of 3 kHz.

I'm going to sound like I'm plugging Sigmira, but the fact is that I've been using it on STANAG 4285 because the parameters can be changed so quickly. Also, the writer has done a good job on the decoder. SkySweeper is fussier to set up, but it also works.

Decoders usually indicate sync when tuning and signal strength are OK. Get as close to the 1800-Hz center as possible. Radios have different offsets, but frequencies often read as the kHz plus 0, .2, .5, and .7. Everything else, unfortunately, must be set manually. STANAG 4285 doesn't autobaud, or do anything else by itself.

Fear not. Nearly everything that we stand any chance of decoding will be 300 or 600 baud, long interleave. In recent years, the text format is usually International Telegraph Alphabet 2 (ITA2), same as used in RTTY. The "message mode" is rarely used, so forget about it.

One commonly used work flow is to start out in 300/long ITA2 with 5N1 framing. If you're in sync but nothing happens, go to 5N2. If nothing happens, try 600, then try changing to 5N1. After that, you might try 1200 baud, but you've probably found an encrypted signal.

You'll know when you hit the right combination. The quality indicator will suddenly jump up. A few seconds later, when the interleaver is full, readable copy suddenly appears. Markers and net procedures are very similar to old military RTTY, with Z-signals and even those RYRYRYRY test loops.

## STANAG 4285 Frequencies

An attempt has been made to identify frequencies with the best chance of actual copy. If the list contained every encrypted tactical frequency ever logged, there'd be no room left in this column. Don't be surprised if a few frequencies have multiple users.

Most frequencies are dial/window readings, not channel centers, so you may need to retune a bit. FN is French Navy, and RFLIE is a NATO routing indicator used by FUF.

***Typical NATO military transceiver with STANAG 4285 capability, this one by Rhode & Schwartz.***

| kHz | Call | Agency | Baud |
|---|---|---|---|
| 2608.4 | FUO | French Navy (FN), Toulon | 300 |
| 2789.0 | FUE | FN, Brest | 600 |
| 2804.2 | IDR | Italian Navy, Augusta | 600 |
| 3810.0 | ? | FN, unknown | 600 |
| 4031.0 | Ship | Italian Navy duplex | 600 |
| 4225.2 | IDR | Italian Navy, Augusta | 600 |
| 4238.4 | FUE | FN, Brest | 600 |
| 4240.2 | FUE | FN, Brest | 300 |
| 4274.8 | FUO | FN, Toulon | 600 |
| 4277.2 | EBA | Spanish Navy, Madrid | 600 |
| 4285.0 | FUG | FN, La Regine | 600 |
| 4295.0 | FUE | FN, Brest | 600 |
| 4401.6 | EBA | Spanish Navy, Madrid | 600 |
| 4428.2 | IDR | Italian Navy, Augusta | 300 |
| 4438.5 | Ship | Italian Navy duplex | 600 |
| 6316.2 | IDR | Italian Navy, Augusta | 600 |
| 6348.0 | FUE | FN, Brest | 600 |
| 6385.0 | FUO | FN, Toulon | 300 |
| 6456.2 | RETJ | Spanish Navy | 600 |
| 8149.2 | IDR | Italian Navy, Augusta | |
| 8300.0 | 6WW | FN, Senegal | 300 |
| 8453.0 | FUO | FN, Toulon | 300 |
| 8463.2 | EBA | Spanish Navy, Madrid | 600 |
| 8478.5 | RFLIE | FN, Martinique | 300 |
| 8568.0 | FUV | FN, Djibouti | 300 |
| 8625.0 | FUM | FN, Tahiti | 600 |
| 12367.0 | 6WW | FN, Senegal | 300 |
| 12587.0 | 6WW | FN, Senegal | 300 |
| 12655.0 | 6WW | FN, Senegal | 300 |
| 12664.5 | FUO | FN, Toulon | 300 |
| 12666.5 | FUG | FN, La Regine | 300 |
| 12667.1 | FUO | FN, Toulon | 300 |
| 12689.0 | FUX | FN, La Réunion | 300 |
| 12857.0 | 6WW | FN, Senegal | 300 |

# UTILITY WORLD

## UTILITY LOGS

*Hugh Stegman*

### ABBREVIATIONS USED IN THIS COLUMN

AFB.....Air Force Base
ALE.....Automatic Link Establishment
AM.....Amplitude Modulation
AWACS.....Airborne Warning And Control System
CAMSLANT.....Communications Area Master Station, Atlantic
CAMSPAC.....Communications Area Master Station, Atlantic
CW.....On-off keyed "Continuous Wave" Morse telegraphy
DSC.....Digital Selective Calling
E06, E07.....Both Russian Intelligence AM formats
E10.....Israeli AM female phonetic letters, call and message
E11, E11a.....English version of "Stritch/Oblique" family
EAM.....Emergency Action Message
EOC.....Emergency Operations Center
FAX.....Radiofacsimile
FEMA.....US Federal Emergency Management Agency
HFDL.....High-Frequency Data Link
HF-GCS.....High-Frequency Global Communication System
LSB.....Lower Sideband
MARS.....Military Affiliate Radio System
Meteo.....Meteorological (weather office)
MX.....All Russian single-letter beacons
NPHRN.....US National Public Health Radio Network
RTTY.....Radio Teletype
S28, 30, 32.....Russian military markers; some voice & data
Selcal.....Selective Calling
SITOR-A.....Simplex Telex Over Radio, mode A
UK.....United Kingdom
Unid.....Unidentified
US.....United States
USAF.....US Air Force
USCG.....US Coast Guard
V02a.....Cuban numbers female, 5-figure callup/groups

*All transmissions are USB (upper sideband) unless otherwise indicated. All frequencies are in kHz (kilohertz) and all times are UTC (Coordinated Universal Time). "Numbers" stations have their ENIGMA (European Numbers Information Gathering and Monitoring Association) designators in ().*

501.5 GW3UEP-UK experimental amateur beacon, CW identifier and dash, at 1947. (MPJ-UK)

2151.5 LEZSEE-German Water Police, ALE sounding, also on 2503.5, at 1848. (MPJ-UK)

2187.5 PHGS-Dutch registry container ship Conceiver, working Bremen rescue center, Germany, DSC at 2222. (MPJ-UK)

2326.0 SEMHQ-NY State Emergency Management Headquarters, (WPHM 628, Albany), ALE sounding at 1104 (MDMonitor-MD)

2414.0 MA1NC-NH Manchester EOC, also on 5192 and 7805, ALE sounding at 0853. (MDMonitor-MD)

2705.0 XSS-UK military Defence High-Frequency Communication System, ALE sounding, also on 2784, 5080, 6416.5, 8107, 8167, and10344.5, at 2032. (MPJ-UK)

3158.9 9MR-Royal Malaysia Navy, Lumut, RTTY test loop at 1955. (PPA-Netherlands)

3167.0 Juliet-Unknown military, link coordination with Delta, Hotel, and Mike in Unitas '09 exercise, also on 5717, at 0025. (Mark Cleary-SC)

3200.0 BP26-German police boat Eschwege, also 6890, ALE sounding at 2009. (MPJ-UK)

3278.0 Unknown-US Army MARS net in progress, LSB at 1137. (Cleary-SC)

3315.0 Unknown-USAF MARS Region 3 Virginia Net, at 0017. (Cleary-SC)

3658.0 "V"-Russian military CW channel marker (MX), Khiva, Uzbekistan, at 2033. (Ary Boender-Netherlands)

3756.0 The Pip-Russian CW marker (S30), at 2034. (Boender-Netherlands)

3828.9 The Squeaky Wheel-Russian marker (S32), at 2034. (Boender-Netherlands)

3933.0 RFFP-French Ministry of Defense, Paris, CW traffic for RFFN (French Navy, Lorient), at 1902. (MPJ-UK)

4026.9 Unknown-US Army MARS net, in progress at 1216. (Cleary-SC)

4032.9 AAA3VA-US Army Mars net control, AAM3RE alternate, LSB at 1106. (Cleary-SC)

4051.0 RAL2-Russian military, CW net control working RLO2 and RBL70, at 1806. (ALF-Germany)

4215.0 XSG-Shanghai Radio, China, CW identifier in SITOR-A marker, at 1956. (MPJ-UK)

4391.0 Unid-Russian Air Defense, time-stamped CW tracking strings, also on 5873 and 6321, at 2233. (MPJ-UK)

4456.0 YUNV-Russian military, CW message for group callsign ZY3A, at 1917. (MPJ-UK)

4469.0 Unknown-Florida Civil Air Patrol net, at 1148. (Cleary-SC)

4500.0 AFA4BT-USAF MARS net at 1219. (Cleary-SC)

4533.5 FDI22-French Air Force, Narbonne, RTTY test loop at 0438. (ALF-Germany)

4557.8 "P"-Russian Navy, Kaliningrad, single-letter CW cluster beacon (MX), also on 8494.8, at 1953. (Boender-Netherlands)

4625.0 The Buzzer-Russian marker(S28), AM at 2032. (Boender-Netherlands)

4630.0 Unid-Russian AM "English Man" (E06), callup 388 then preamble 269/70, at 2200. (Mike-West Sussex, UK)

4663.0 Tashkent Meteo-Russian Volmet, formatted weather at 1912. (ALF-Germany)

4700.0 Halifax Military-Canadian Forces, radio check with Pathfinder 31, a CP-140, came from 9010, at 2216. (Cleary-SC)

4752.0 Orenburg Meteo-Russian Volmet, weather at 0137. (ALF-Germany)

4850.0 RBI-Unknown Russian government, RTTY "Radiogrammas" and operator chatter, then back to CW marker, at 0410. (ALF-Germany)

4900.6 Sector St. Petersburg-USCG, calling SHARK 72 (USCG Cutter Crocodile) at 2317. (Cleary-SC)

4996.0 RWM-Russian Institute of Metrology for Time and Space, CW time signals at 1923. (ALF-Germany)

5006.0 Florida CAP 48-US Civil Air Patrol, calling Middle East CAP 43 at 2341. (Cleary-SC)

5135.0 SEMO05-NY State Emergency Management Office, Region 5, ALE sounding at 0522. (Cleary-SC)

5153.7 "D"-MX, Sevastopol, also 7038.7 and 13527.7, CW at 1833. (Boender-Netherlands)

5171.0 RGZ58-Russian Navy vessel, CW with RCV (Black Sea Fleet), went to 6094 for MPSK traffic, at 0430. (ALF-Germany)

5235.0 RKA80-Russian Navy, CW procedural traffic with RMP (Baltic Sea Fleet Headquarters), at 0143. (ALF-Germany)

5246.0 FAV22-French CW Morse training net, 5-letter groups at 1987. (MPJ-UK)

5400.5 Unid-Russian Navy, Caspian Sea Flotilla Headquarters, Astrakhan, information broadcasts to group callsign RKN, CW at 0330. (ALF-Germany)

5410.0 LE1OA-Norwegian Emergency Operations Network, pre-exercise net in Norwegian with LE1DA and many others, at 1510. (ALF-Germany)

5500.0 QV5B-Probable Chinese military, calling 7NPE, CW at 1829. (PPA-Netherlands)

5544.0 HS-TND-Thai Airways International Airbus A340, flight THA970, HFDL position for Muharraq, at 2159. (MPJ-UK)

5565.0 CC-CQF-LAN Chile A340, flight 705, working Dakar, Senegal, at 0507. (Patrice Privat-France)

5708.0 Blue 41-USAF KC-10A tanker, radio check at 0310. (Cleary-SC)

5726.0 Unid-French military, CW Morse training net with 0404, went to 5725 USB for voice coordination at 1219. (ALF-Germany)

5732.0 Hammer-US Immigration and Customs Enforcement, working Omaha 3CC, a Cessna 550, at 0117. (Cleary-SC)

5753.0 RIT-Russian Navy Northern Fleet Headquarters, Severomorsk, CW traffic to RLO at 2100. (ALF-Germany)

5775.0 RCV-Russian Navy Black Sea Fleet Headquarters, Sevastopol, weather for RKZ at 1946. (MPJ-UK)

6094.0 RCV-Russian Navy Black Sea Fleet Headquarters, Sevastopol, Ukraine, CW with RGZ58, also MPSK on 5171, at 0435. (ALF-Germany)

6271.5 UAA-Russian Stern Trawler Kapitan Morgun, SITOR-A telex with UDK2, Murmansk Radio, at 2116. (ALF-Germany)

6450.0 GRECO-Italian Financial Police, Torre Del Greco, ALE with PRATICA01, voice as Sirio 10 calling Squalo 8, ALE at 1538. (ALF-Germany)

6661.0 N663US-Northwest Airlines flight NWA68, a Boeing 747, HFDL position for Riverhead, at 2321. (MPJ-UK)

6712.0 OD-MEA-Middle East Airlines flight ME1302, an A330, HFDL performance data for Reykjavik at 1936. (MPJ-UK)

6721.0 Reach 143-USAF Air Mobility Command KC-10A, patch via Andrews to Travis AFB, CA, at 0132. (Cleary-SC)

6721.4 Foxtrot Lima-Joint multi-national exercise, link coordination with many stations at 2130. (ALF-Germany)

6730.0 Herakles-Austrian Air Force, Vogler AFB, working JGP 14, a C-130 supplying the Kosovo UN force, at 0956. (ALF-Germany)

6739.0 Reach 926-USAF, patch via Puerto Rico HF-GCS to Scott AFB, IL, at 0147. (Cleary-SC)

6761.0 Reach 716-USAF, air-air radio check at 0135. (Cleary-SC)

6778.0 9857-Turkish Red Crescent, also on 6921, 8150, and 9045, ALE soundings at 1947. (PPA-Netherlands)

6827.0 RIT-Russian Navy Northern Fleet Headquarters, Severomorsk, weather for RLO, at 1437. (ALF-Germany)

6840.0 EZI1-Israeli Intelligence test call (E10), jammed, AM at 1801. EZI2-E10 null message, AM callup only at 2031. (Mike-UK)

6848.0 G3W-Chilean Navy, working HLA, ALE at 0200. (ALF-Germany)

6855.0 VL-Swedish Army, calling VJ and VN, ALE at 1007. (ALF-Germany)

6890.0 BP21-German police boat Bredstedt, ALE sounding at 2025. (PPA-Netherlands)

6941.0 Unid-Russian AM "English Man" (E07), null-message callup "902 000," at 0700, repeated on 8041 at 0720. (Mike-UK)

6955.0 TWBM2-Spanish Guardia Civil, Manresa, calling TXX2 (Madrid), ALE at 1940. (PPA-Netherlands)

7039.0 "C"-MX, Moscow, also 10872.0, CW at 1833. (Boender-Netherlands)

7480.0 KNNP491WV-American Red Cross, ALE sounding at 1321. (Cleary-SC)

7527.0 IKL-USCG Cutter Tampa, calling HSD, Cutter Drummond, ALE at 0039. (Cleary-SC)

7531.5 RUH955-US Army UH-60L, calling SKYWAT (Soto Cano Air Base, Honduras), ALE at 0142. (Cleary-SC)

7967.5 RAF Volmet-UK Royal Air Force aviation weather, nothing heard on usual 5490, at 2333. (Mike Chace-Ortiz-ME)

8023.0 001CDCS36-NY State Department of Health (WNG 920), working 010CDCNHQ, US Centers for Disease Control, GA, also on 10202, 12164, and 13488 (all NPHRN), ALE at 1532. (Jack Metcalfe-KY)

8047.0 M050IN-National Guard at MI State EOC, Lansing, calling HQ703N (Nat'l Guard Readiness Center, Arlington VA), ALE at 1451. (MDMonitor-MD)

8181.5 JFHQME-Maine National Guard, Augusta, ALE sounding at 1648. (MDMonitor-MD)

8196.0 Unid-"Oblique" family (E11a), callup "283 Oblique 34," at 0915. (Mike-UK)

8291.0 CAMSLANT-USCG, VA, answering DSC distress broadcast from 215533000 (Malta registry tanker Disha), at 2241. (Cleary-SC)

8337.6 Shark 07-USCG, working HU-25 Swordfish 05, at 2159. (Cleary-SC)

8340.0 LSH3-Venezuelan Navy, calling 4LA3, LSB ALE at 1006. (MDMonitor-MD)

8461.9 9MR-Royal Malaysia Navy, working warship Paus in RTTY, at 1708. (MPJ-UK)

8484.0 HLG-Seoul Radio, Korea, CW marker at 1947. (PPA-Netherlands)

8782.0 XSQ-Guangzhou Radio, China, Chinese phone call from unknown ship at 1824. (PPA-Netherlands)

8888.0 Unid-Probably Russian Volmet, Novosibirsk, aviation weather in Russian at 1842. (MPJ-UK)

8894.0 F-GRXI-Air France flight AF0886, an A319, answered selcal EJ-BC for position check with N'djamena Radio, Chad, at 1825. (PPA-Netherlands)

8912.0 USCG CAMSPAC, CA, working HC-130 Coast Guard 1716, at 0209. (Cleary-SC) D45-US Customs P-3, ALE sounding at 1928. (MDMonitor-MD)

8918.0 Cactus 968-US Airways, position and course change with New York Radio, given secondary frequency of 11330, at 2029. (Allan Stern-FL)

8957.0 CC-CWN-LAN Peru flight LP2515, HFDL position for Santa Cruz, Bolivia, at 0534. (PPA-Netherlands)

8971.0 Red Talon 711-US Navy P-3C, working Goldenhawk (Brunswick, ME), and Red Talon 712, at 1538. (Stern-FL)

8977.0 EI-LVB-Livingston Airlines A321 flight LVG205, HFDL position for Reykjavik at 1847. (MPJ)

8983.0 CAMSLANT Chesapeake-USCG, VA, working HC-130J Coast Guard 2006, at 1548. (Stern-FL)

8990.0 DP1FA-Algerian National Police, Djelfa, calling PP1DS, ALE at 1427. (PPA-Netherlands)

8992.0 Spit Ball-US military, followed a HF-GCS station's 28-character EAM with a repeat of the same, simulcast on 4724 and 11175, at 1433. (Jeff Haverlah-TX)

9007.0 Canforce 2631-Canadian Forces CC-130, weather and patch to Wing Ops via Trenton Military, at 2013. (Cleary-SC)

9025.0 580109-USAF KC-135 tanker, ALE-initiated voice with ICZ, Sigonella, Italy, at 0636. (PPA-Netherlands) JUPITRE-Mexican Army "planets" net, calling PLUTON, ALE at 0059. UKE301-UK Royal Air Force E-3D AWACS, ALE sounding at 1355. ADW-USAF, Andrews AFB, MD, ALE with KYAASF (KY Army Aviation Support Facility), then voice radio checks, at 1423. (MDMonitor-MD)

9060.0 Unid-"Oblique" null message format (E11), callup 552 Oblique 00, at 0815. (Mike-UK)

9106.0 KBPNNN-US Navy/Marine Corps MARS, voice call NNN0KBP, ALE sounding at 1523. (MDMonitor-MD) WWLNNN, voice NNN0WWL, ALE sounding at 2258. (Cleary-SC)

9122.5 LRD1-US Army Corps of Engineers, Great Lakes and Ohio Division, ALE sounding at 1524. (MDMonitor-MD)

9350.0 3V2Y-Venezuelan Navy, working T8R1, LSB ALE at 2326. (MDMonitor-MD)

9414.5 KGD825-US Environmental Protection Agency, MA, ALE sounding at 1221. (Metcalfe-KY)

10051.0 New York-NY Volmet, aviation weather for East Coast airports at 2041. (Stern-FL)

10063.0 "11"-New Aeronautical Radio, Inc HFDL ground station, Panama, squitters at 2328. (MPJ)

10066.0 B-2299-Sichuan Airlines A319 flight 3U8842, China, HFDL position for Hat Yai, Thailand, at 1609. (PPA-Netherlands) RP-C8606-Philippine Airlines A320 flight PR0466, HFDL position for Hat Yai, Thailand, at 1750. (MPJ)

10202.0 OH5-FEMA WGY945, OH State EOC on NPHRN, calling 010CDCNHQ, Centers for Disease Control, ALE at 1640. (Cleary-SC)

10538.6 Swordfish 13-USCG HU-25, working Sector Key West at 0138. (Cleary-SC)

10588.0 FC1-WGY901, FEMA Region 1, MA. calling RI1 (WGY971, RI), ALE at 1231. (Cleary-SC)

10871.8 "M"-New mystery CW single-letter beacon, halfway between two Russian MX cluster slots, at 1833. (Boender-Netherlands) [10871.85 kHz, as heard consistently here in CA. ?? -Hugh]

10872.1 "A"-MX, possibly Astrakhan, also 13528.1, CW at 1833. (Boender-Netherlands)

11090.0 KVM70-Honolulu meteo, Hawaii, FAX Pacific satellite image at 0636. (PPA-Netherlands)

11175.0 McClellan-USAF HF-GCS, CA, patching Rocco 82 (NJ Air National Guard KC-135) to Torch Control (McGuire AFB, NJ), at 1525. Puerto Rico-USAF HF-GCS, Salinas, patching Raider 08 (US Marine Corps KC-130), at 2230. (Stern-FL) Clean 11-USAF, patch via Offutt HF-GCS to Eielson AFB Ops, AK, at 2140. (Cleary-SC)

11226.0 297044-USAF C-17A, ALE sounding at 1509. (Cleary-SC)

11232.0 Canforce 4099-Canadian Forces, patches via Trenton Military, at 1933. (Stern-FL) King 81-USAF rescue C-130, patch via Trenton to King Ops (Davis-Monthan AFB, AZ) at 2344. (Cleary-SC)

11312.0 VP-BWN-Aeroflot A321, flight SU0260, HFDL link fault report for Muharraq, at 1449. (MPJ)

11330.0 New York Radio, sellcalling BF-HP, US Airways 767 flight Cactus 1024, gave backup frequency of 6577, at 1953. (Stern-FL)

12577.0 477287000-Hong Kong registry vessel Saga Wind (VRUR7), DSC call at 1929. 357280000-Panama registry tanker Chemstar Venus (3FEX9), DSC call at 1956. (Privat-France)

12581.5 XSV-Tianjin Radio, China, CW identifier in SITOR-A marker, at 1506. (MPJ)

12916.5 HLF-Seoul Radio, Korea, CW marker at 1517. (MPJ)

12922.0 HLW2-Seoul Radio, Korea, CW marker at 1519. (MPJ)

13149.0 Unid-Murmansk Radio, Russia, phone call traffic at 1606. (MPJ)

13257.0 Sentry 50-USAF E-3 AWACS, patch via Trenton Military to Falcon 3 at Tinker AFB, OK, at 0021. (Cleary-SC)

13270.0 Gander Radio-Canadian Volmet, Hat Yai HFDL also audible, at 1814. (MPJ-UK) New York Volmet, weather at 2035 (Stern-FL)

13927.0 Hawk 21-USAF B-1B, patch via MARS AFA5RS to Dyess AFB, TX, for weather at 1925. (Stern-FL)

15016.0 Andrews-USAF, Andrews AFB, MD, 22-character EAM at 1846. (PPA-Netherlands) Convoy 3982-US Navy C-130T, patch via Puerto Rico HF-GCS at 2323. (Cleary-SC)

16332.0 "C"-Russian Navy CW single-letter beacon (MX), Moscow, at 1145. (MPJ-UK)

16811.0 CBV-Valparaiso/Playa Ancha Radio, Chile, CW identifier in SITOR-A sync marker at 2110. (Hugh Stegman-CA)

16986.0 CTP-Oeiras Naval Radio, Portugal, RTTY marker at 1557. (MPJ-UK)

17159.2 NMC-USCG CAMSPAC, FAX Pacific Surface Analysis at 2145. (Stegman-CA)

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# The Mexican "M42" Network

This month we focus on a network that has taken a number of months to unravel and there is still more work to do. Sometimes investigating networks just takes a lot of time. I'm also indebted to listener Jon in Florida, who, like me, is a frequent visitor to the *#wunclub* IRC chat channel (see later). He filled in a lot of gaps and provided many long recordings of the voice traffic for analysis.

## ❖ In the Beginning

About six months ago, Jon happened upon 7790 kHz carrying ALE from a group of stations that use a number of distinctive identifiers including M42, A08 and P23. Jon reported them using the IRC logbot (see below). For some reason that I can't recall, I happened to be checking some other logs for P23 and noticed Jon's entry.

Checking archives back a couple of years turned up a few more channels for the network including 7802, 10364 and 10803 kHz USB. Spanish chatter had been noted by Jon and other listeners who had come across the same identifiers, but no more information than that. Most logs also noted the presence of a +1000 Hz piptone when the mic key was released on the channels.

The piptone and the presence of other 3-digit numeric identifiers were reminiscent of a Mexican Police network previously logged on 8175 kHz. However, at that time, the network control node was "2000" and all outstations carried an "R" in front of the three digit number. Leaving the radio on this frequency soon confirmed that this was indeed the same network and the ALE identifiers had changed to that on the other frequencies.

From there, the chase was on to discover more.

## ❖ Even More Channels ...

Over many nights, Jon and I were chatting to others on IRC and by chance stumbled upon a couple more frequencies including 7967 and 8115 kHz. Voice activity was always weak and difficult to copy. However, by collecting many days worth of ALE logs and voice activity, we gradually began to build a better picture of the network.

The majority of ALE traffic (soundings, link quality checks and link-ups) came from the stations beginning with a letter: A08, C03, C06, C17, M01, M42, P23, R17 and Z25. Of these, M42 is by far the most active. These main nodes connect to outstations that use three digit identifiers. A total of 60 outstations have been noted thus far, with lowest being 010 and the highest 361. There is relatively little ALE traffic between the three digit stations or from them to the letter and two digit stations.

Listening to the voice chatter slowly began to confirm a Mexican origin for the network, with the cities of Saltillo, Monterrery, Cuernavaca, and other cities close to the Federal District mentioned. Much of the channel activity comes from a woman operator who constantly conducts a "roll-call" and check-ins with the outstations. The outstations certainly use the same numeric identifiers as their ALE.

It is also apparent that much of the chatter involves traffic reports, road conditions, and other highway related activity. On days where the signals were particularly strong, even police sirens could sometimes be heard in the background. Evidence was certainly pointing towards the users being connected to police.

Within a few months, we had a large number of channels, including: 7563, 7640, 7790, 7802, 7815, 7828, 7920, 7967, 8115, 8175, 10364, 10369 and 10803 kHz USB.

Note the interesting frequency distribution in this network. Normally, ALE-controlled networks use a pool of 20 or so channels that are well-spaced throughout the HF spectrum, so as to provide reasonable chance of making a connection on one frequency according to time of day and prevailing propagation conditions. In this case, we have nearly all channels within a couple of MHz of spectrum, suggesting a very localized network. This may also explain why the YL net controller is most often heard complaining about not being able to hear her outstations!

Close monitoring of the ALE has revealed that a main node will attempt the next higher channel if a connection is not made and that main nodes hand over control to another main node if the previous one was not able to reach the given outstation. This is much like a mobile phone network-style of operation rather than the usual HF ALE process.

## ❖ What (or Who) is Contestia?

There are infrequent AMD messages passed between a main node and an outstation that use the word CONTESTIA. Having seen no other AMD messages, it wasn't until Jon noticed that one of the channels was occupied with Tadiran voice encryption that we made a possible connection.

Tadiran radios are well-known for their +1000 Hz piptone when operating in normal voice mode. The fact that Tadiran voice encryption was noted, suggests that the Israeli manufacturer has supplied the radios in this case. We have yet to confirm that CONTESTIA is the command word used to switch a connection to encrypted mode, but this is likely to be the purpose.

## ❖ The Final Breakthrough

After several months of monitoring the network, Jon finally received an AMD message that contained the details of a vehicle plate check:

FOLKSWAGEN 2000 BCO PCAS 317 PHT 45MEC
KM 32 DE MEX-CUERNA

It's therefore quite likely that this network is operated by the Mexican Highway Police.

## ❖ Internet Relay Chat

Like to hunt for interesting new signals with a few like-minded individuals? Internet Relay Chat (IRC) offers a channel dedicated to digital utility listening called *#wunclub* in honor of the original name for the utility monitoring group that is now known as UDXF. An IRC channel is basically a chat room where members can participate in group or private chats, exchange files and so on. There are many software programs, both free and paid, that are available on just about every operating system for chatting on IRC.

The #wunclub channel has something special to help listeners, too: an automated robot or simply "bot" called NSA. Aside from issuing an intermittent amusing ditty by watching the chatter on the channel, NSA can provide the current propagation conditions, can be asked to search a very extensive logbook for a station or frequency, and can also collect and organize logs made by listeners to the channel. The logs submitted by listeners to NSA are sent in a daily email message to the UDXF list.

In all, this makes #wunclub an excellent place to hang out when you have time to play radios and has constantly drawn my attention to things I probably would otherwise have missed. Log in and give it a try.

### RESOURCES

Tadiran Voice Clip: **signals.taunus.de/WAV/TADIRAN_VX-cry.WAV**
IRC Help Guide: **www.irchelp.org**
IRC #wunclub Channel: **irc.starchat.net**
UDXF: **groups.yahoo.com/group/udxf**

*Fred Waterer*
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*www.doghousecharlie.com/radio*

# Health Matters

As the population ages, health concerns are increasingly a focus of attention. This has really hit home to me in the last few years as I have dealt with serious health concerns among both friends and family. On more than one occasion, I've been helped by these programs, which can at times offer sound advice, or point one in the right direction.

Health issues are very much in the news, H1N1 or "Swine Flu" being the most recent example (as this is written). Of course this is nothing new. Almost from the beginning of radio there have been individuals who used the medium to inform, and some who used it to exploit people's health concerns.

Perhaps the most famous, or more correctly, *infamous* of these was "Dr." Brinkley. Brinkley is one of the more colorful characters in the history of broadcasting. He seems to have spent most of his life managing to stay one step ahead of the law. He figured out the power of radio, opening stations in first Kansas (before it was shut down) and later Mexico (the first "border blaster"), offering medical advice to listeners who wrote in, country music, and promotion of his clinic, which offered a somewhat "unique" treatment for impotence (transplantation of "goat glands"). Many patients died after this useless procedure.

Fast forward to 2009. Health programs today seem to be proliferating. Or maybe I am just starting to notice them now that I am no longer an "indestructible" youth. Either way, there are many quality programs that one can hear today for sound information about health and medical matters. And none of them involve goat glands.

## ❖ Britain: BBC

Let's start with the BBC. The World Service offers **Health Check**, a program which looks at "the issues affecting the world of medicine and healthcare." Hosted by Claudia Hammond, recent episodes have looked at "how governments prevent panic during a serious health outbreak," "the ethics of epidemics, visual neglect and stroke and snakebite treatment," and "mental health in Cambodia." The program can be listened to or downloaded from its home page at:

🔊 **www.bbc.co.uk/worldservice/science/2009/03/000000_health_check.shtml** or one can subscribe to the podcast. It is a fairly general interest health program, with obviously a worldwide focus. It can be heard UTC Mondays at 1032, 1632 and 2032, and


UTC Tuesdays at 0132.

On BBC Radio 4, one can hear the very excellent **Case Notes** hosted by Dr. Mark Porter. "Mark Porter joined the BBC in 1992. He was health editor at Radio Times for 10 years, and has presented **Watchdog Healthcheck**; is a regular on the **Jeremy Vine Show** on BBC Radio 2; and presents **Case Notes** on Radio 4. Mark spent five years in a variety of hospital specialities before entering general practice in 1990, where he still works half-time at his busy NHS practice in South Gloucestershire.

"…The programme gives listeners (and the presenter) an all too rare an insight into what leading specialists from around the world consider important in their particular field, putting the various breakthroughs and inevitable controversies into true context. There's an old medical adage that if you want a good opinion, then ask a busy doctor – and that's exactly what we do on **Case Notes**."

I can highly recommend **Case Notes**; it is a regular listen here. A recent program on breast health was most helpful in the wake of a recent scare affecting a friend.

Another BBC program on Radio 4 is **Health Check** hosted by Barbara Myers. It is a "medical discussion programme in which listeners phone-in and ask a weekly guest about their particular area of knowledge." As this article is being written the program is in hiatus; however, the website has an archive of information from past shows covering numerous topics from A-Z, from *ADHD* to *Wanted and Unwanted Hair* (okay, there's nothing listed under Z). It's a collection of information I have accessed more than once in my search for more information about what was going on in someone's treatments.

🔊 **www.bbc.co.uk/programmes/b006qyt7**

Finally, the BBC offers a podcast called **Medical Matters** which seems to offer the "best of" **Case Notes, Health Check** and possibly other BBC health related programming.

## ❖ Radio Australia

Radio Australia carries **The Health Report** from Radio National. Hosted by Dr. Norman Swan, "The Health Report appeals to both specialist and mainstream audiences by applying a broad definition of health, and seeing health and medicine within social, scientific and political contexts." The program can be heard UTC Mondays at 1031 and 1530 UTC.

"Producer and presenter of the **Health Report**, Dr Norman Swan, is a multi-award winning producer and broadcaster.

"Dr Swan's career has been highlighted by his desire to keep the Australian public informed of health developments as they happen. This allows him to combine medical expertise with investigative reporting, clear analysis and the knowledge to report the latest research in health and medicine.

"One of the first medically qualified journalists in Australia, Dr Swan is highly regarded by the medical and health professions."

**The Health Report** promotes itself as "a valued information source for professionals and students in the medical and health professions, as well as attracting a sizable audience of general listeners seeking jargon-free, easy-to-understand information and analysis on health and medical matters." **www.abc.net.au/rn/healthreport/about/**

Recent episodes have focussed on cardiac procedures, flu research, spinal surgery and stroke treatment. As with many Radio National programs, audio of past episodes are archived for up to four weeks, and transcripts go back even longer. You can also subscribe to the podcast. It's an interesting program. The program on cardiac

procedures was informative, but I found parts of it sometimes "over my head." Maybe it's just me.

Staying in Australia for a moment, I am a long time listener, via the internet, of **Remember When**, a program on 3AW Melbourne. It is a Sunday night nostalgia show that airs very early Sunday morning in my local time. The hosts, Bruce and Phil, are long-time broadcasters and residents of Melbourne and talk with listeners about days gone by. One particularly interesting program focussed on memories of Radio Luxembourg (many Australians are transplanted Brits and would have grown up listening to it).

Just before Bruce and Phil take to the air, there is a medical program called **Talking Health** with Dr Sally Cockburn. She covers some topics that one normally doesn't hear in this part of the world, including health and recovery following the Australian bush fires. One can hear this program Sundays at 0800 UTC. You can also subscribe to a podcast at the link: **www.3aw.com.au/talkinghealth**

## ❖ Health Matters in Canada

Dr. Joe Schwarcz is a Canadian talk show host heard on CJAD 800 Montreal and CFRB 1010 in Toronto (and therefore also on CFRX 6070 kHz). A friend who is a regular poster on the Southern Ontario-Western NY Radio board (**www.sowny.ca**) is something of a one-man fan club when it comes to this program. So I asked him, what is it about this program that makes him consider it "must listening"?

His response was (1) Dr. Schwarcz has impressive credentials (McGill University). (2) He makes complex issues easy to understand, both on radio and in a number of very readable books. (3) He's honest. A caller asked about a product that advertises it will flush 20 LB of spackle from your intestines. His response was, "I know it is a sponsor at this station, but the claims are bogus. It is a fraud." (4) New topics every week and (5) A believable delivery, not a hired radio "voice" preaching to the listener.

Dr. Joe is heard Sundays at 3pm Eastern (1900 UTC) **www.cfrb.com/shows/501331** Remember, CJAD and CFRB can also be heard live via the internet.

My friend George touches on a number of points that make these (and any program for that matter) enjoyable: intelligent, sometimes humorous hosts; honesty and trustworthiness; making complex issues easy to understand, and presenting them in an entertaining way. All of the programs discussed this month so far certainly fulfill these requirements.

This brings us to the last, and best, program of them all: CBC Radio One's **White Coat, Black Art.** This is (in my opinion) the Cadillac of health and medicine programming. **White Coat, Black Art** was originally a summer replacement show on CBC Radio One, but it took off and became quite a hit. One of the initial episodes was about negotiating one's way through the health system in Canada if you don't have a family doctor (so called "orphan patients"). The program immediately paid off for me, as some of the information included in that early show helped me to set up a friend with a doctor.

"Dr. Brian Goldman takes listeners through the swinging doors of hospitals and doctors' offices, behind the curtain where the gurney lies.

"It's a biting, original and provocative show that will demystify the world of medicine.

"We'll explore the tension between hope and reality: between what patients want, and what doctors can deliver. Doctors, nurses and other healthcare professionals will explain how the system works, and why, with a refreshing and unprecedented level of honesty."

It's very informative, and as a result of his easy conversational style, very entertaining, too. This program is definitely one of the gems on the CBC Radio One broadcast schedule. It was announced in mid-May that **White Coat, Black Art** will return in September with a full season of programs. In the meantime, many past episodes are available to listen online at **www.cbc.ca/whitecoat/**

## ❖ Some other shows:

*Radio Taiwan International*

**Health Beats** hosted by Angelica Oung: **Health Beats** "bring(s) you the latest news from the world of health and medicine" The program airs as the first item on Monday broadcasts. A recent episode concentrated on ways to get a restful sleep, including attending a sleep clinic.

*Voice of Russia*

While not having a dedicated health program, sometimes other programs swerve into the topic. On one memorable occasion, Estelle Winters host of **Timelines**, spoke to the wife of an African diplomat, who discussed the travails of giving birth in Moscow.

Today there are still a lot of programs seeking to play on people's health concerns. Sundays are the bane of listeners in many North American markets, as infomercials flog all sorts of items including health remedies. Over the years many shortwave stations have sold time to hucksters marketing these "health products." While I have no evidence to suggest they are modern day "Dr. Brinkleys," one should always take claims of people marketing such products with a grain of salt. And if they mention goats, run!

## ❖ Is this the party to whom I am speaking?

Lily Tomlin used to ask this as part of her routine as the snorting telephone operator, Ernestine. It seems odd to me that there aren't more international phone-ins, considering how inexpensive long distance phone calls have become. With today's internet technology they can even be free.

### BBC – World Have Your Say

"What is **WHYS**? It's two things. It's the name we use to describe the conversation between all the BBC World Service's news programme and our audience. And it's a BBC News discussion programme where people around the world set the agenda. We endeavour to use all technology available to us to make the programme as open as possible. We receive phone calls, calls over the net, text messages, emails and comments on our blog. We aim to create a global conversation where the BBC provides the platform, but our contributors control the topics we discuss and how they are discussed.

When does **WHYS** broadcast? The program broadcasts at 1800GMT from October until April, then depending where you are in the world at 1700GMT or 1800GMT between April and October. Lots of info on this web page in regards to ways one can participate. **http://worldhaveyoursay.wordpress.com/whys-faqs/**

*This column is dedicated to the memory of my friend Brian Smith, veteran Toronto EMT, long time SWL and Chairman of the Ontario DX Association, who died suddenly in March. While chatting one day in 2008, he suggested health related programs might be an interesting topic for one of my columns.*

# GLOBAL FORUM

**THE WORLD OF SHORTWAVE BROADCASTING**

*Glenn Hauser*
*P.O. Box 1684-MT, Enid, OK 73702*
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## China's Mixed Feelings about Shortwave

China Radio International, which has added more and more transmissions to become the world's major shortwave station in terms of output, may be having second thoughts, considering reducing SW or even eliminating some services, based on audience research in English-speaking countries indicating there is really not enough interest in SW listening to justify the expense. CRI officials visiting SWL meetings were not impressed by the mere DX hobbyists and QSL-collectors they encountered, rather than opinion-formers genuinely interested in the programming.

Such resources could be put to better use: After all, the fewer SWBC transmissions for real listeners, the more transmitters available for jamming attempted broadcasts into China!

The twentieth anniversary June 3 of the Tianamen Square massacre led to stepped-up jamming as early as April. Formerly, all Firedrake music jamming was synchronized from a single satellite feed, but then two separate feeds appeared, the most active frequencies being 8400, 9000, 13970, 15150 and 15600, depending on peregrinations of the Falung Gong clandestine Sound of Hope; plus CNR-1 network programming blocking countless other frequencies used by Western broadcasters in Chinese. Some services normally unjammed, such as FEBC on 9400, were also hit, perhaps by mistake.

Furthermore, CRI and all other Chinese broadcasters are under additional censorship until July 31 – news and other programs formerly live have to be pre-recorded, to prevent anything unapproved being broadcast.

***ARGENTINA*** No reports of them for several months, but the army relays of Buenos Aires stations were heard again in April and May on 15820-LSB: Radio Continental at 1640 giving e-mail address (Rubens Ferraz Pedroso, Brasil, *dxclubepr* yg) Maybe same station with fútbol another day around 2200 (Harold Frodge, MI, *DX LISTENING DIGEST*) R. Mitre relay at 2340-0005 with soccer coverage, 0001 ID, excellent (Terry L Krueger, FL, *WORLD OF RADIO*)

RAE German service, M-F 2100-2155 on 15345, announced tests in May-July, repeating it next weekday at 1700-1755 on same (Douglas Kaehler, *A-DX* via Wolfgang Büschel) Usually blocked both in Europe and NAm by Morocco on 15345 at 2100; trouble is, Morocco is also on 15345 at 1700. What RAE really needs to do is change frequency only 5 kHz, as 15340 is open 1700-2200, but that would be unthinkable. It might be easier to persuade Morocco to stay on 15340 instead of shifting to 15345 at 1500 (gh)

RAE was varying up to 15345.09, too much QRM from Morocco (Brian Alexander, PA, and Brandon Jordan, TN, *DXLD*) First day of 1700 UT test, additional problem: Ethiopian DRM-like jamming spreading 15343-15356 against five TDP clandestines via Russia on 15350 (Wolfgang Büschel, Germany, *WORLD OF RADIO*)

However, Morocco planned to observe DST from June 1 to August 20, probably leading to 15345 closing an hour earlier at 2100 like last summer (gh)

***BANGLADESH*** Bangladesh Betar Domestic Services relay on 7250 was heard in late April between 0215 and 0310 in Bengali, plus hum audible as early as 0200 and not as good as previous 4750 (Gautam Kr. Sharma, Assam, India, with thanks to Mr. A. M Bain of Durg, Chattisgarh, India via Swopan Chakroborty, Kolkata, *DXLD*)

7250 had been used only for evening external service 1230-2000; at 02-03 beware of CNR-8 Korean service from Beijing also on 7250, but both of these are well into daytime.

Bangladesh plans to start applying summer time UT +7h in June (*WRTH Update* April 14) What nonsense! That would make it an hour and a half ahead of India which is not only west, but north and east of Bangladesh, and even a half hour ahead of Burma further east. In mid-May, **timeanddate.com** did not show this upcoming (gh)

***BOLIVIA*** R. Virgen de Remedios, Tupiza on new 4835 from late April, at 0315 with Catholic programming, WEWN relay? to abrupt 0356* No definite local ID at first in late April, just R. Católica Mundial, also heard in morning (Lúcio Otávio Bobrowiec, Brasil, *DXLD*) Had been recently reported on 4111v and 4554v; more likely you were hearing another Catholic, R. Marañón in Perú (Dario Monferini, *playdx* yg) Yes, but VdR jumps around a lot, so why not 4835, too? (gh) 2312 reverbing service from inside a church and finally definite ID at 0014 as "R. Virgen de Remedios" (Bobrowiec, *DXLD*) Next night at 2310 measured on 4834.93 while Perú was on 4835.42 (Bob Wilkner, FL, *ibid*.) By now may have jumped somewhere else though (gh)

***CANADA*** [and non] RCI's Spanish to the USA on 7325 at 1205 is ruined by CRI in Japanese on same frequency; apparently nobody realized that the broadcast direct from China toward Japan would rival or overcome the Sackville transmission even in central NAm (gh, OK)

***CENTRAL AFRICAN REPUBLIC*** 7220, R. Centrafrique, Bimbo, 1216- 1411, vernacular, African pops, news at 1300 when signal much better, pops, another newscast at 1400 but QRM. So this is not inactive after all; only the power is surely much less than it used to be (Carlos Gonçalves, Portugal, *WORLD OF RADIO*)

***CHAD*** RNT, N'Djamena, 6165.14 turned on at 0417 and rapidly drifting downward to 6165.0 by 0427 when they began modulating with Balafon interval signal; precisely at 0430, La Tchadienne, National Anthem, 0431 ID "Ici N'Djamena, Office Nationale de Radiodiffusion et Télévision du Tchad." 0432-0450 hi-life vocals, then lively male chatting over music; 0452 talks by man and woman until reception ruined at 0459 when R. Nederland via Bonaire returns to 6165.

Good strong signal, slightly distorted modulation except during music. Nice one hour respite from Bonaire allowing for an excellent prime-time window to Africa, also with Zambia at 0400; too bad it couldn't last longer (Brandon Jordan, TN, *DXLD*) Another night Chad abruptly on at *0434 (Brian Alexander, PA, *ibid*.) Also good here, 0450 hilife, French good-morning from Ndjamena, modulation slightly distorted on music. Blocked at *0458 by RNW OC and IS, opening Dutch (gh, OK) Excellent at 0454 with domestic news (David Norrie, New Zealand, *DXLD*)

***COSTA RICA*** Website dedicated to maintaining the legacy of Radio for Peace International, whose voice on the airwaves was silenced in 2003, is up and running at **www.rfpi.org** (Franklin Seiberling, (KC0ISV), IA, webmaster, *DXLD*)

***CUBA*** RHC had to make some frequency adjustments in April, May: 11820 chosen for Portuguese, Arabic and Spanish, 2000-2300 to Europe was already in use by Saudi Arabia in Arabic, so RHC moved to 11770. 6180 evenings in Spanish replaced by 6120. 13780 ex-15370 at 1300-1500 in Spanish, but leapfrogging 13680 to put spurs on 13880, and vs Prague on 13580. 12000, mornings in Spanish was hit by a distorted Russia in Chinese, so RHC went away (gh)

[non] Radio República tried a new frequency for a few days at end of April, 9840 between 2100 and 2300. It never got jammed, but was dropped anyway after the test. Continued using 9545 after 2300, heavily jammed (gh)

Fiscal Year 2010 Budget Request for U.S. International Broadcasting proposes a transition of TV Martí's two 30-minute newscasts to news updates on the half-hour, conversion of Radio Martí to a 24/7 news and information format (via Alokesh Gupta, *DXLD*) What, no more entertainment or opinion to attract listeners? But they would keep béisbol (gh) See also USA

***CYPRUS*** Cyprus Broadcasting Corporation (CyBC) offers the unique opportunity of learning Greek through the Internet for English- speaking listeners. A total of 105 lessons (audio files) are offered online:

**www.cybc.com.cy/index.php?option=com_wrapper&Itemid=233** (John Babbis, MD, DXLD)

***EAST TURKISTAN*** Looking through the Aoki frequency table, I noticed countless listings for ''TKS'' as the country where some Chinese transmissions come from, the Kashi site and the Urumqi site. Apparently these parts of China are now considered to be a separate country, East Turkistan (not to be confused with TKM for Turkmenistan on its few frequencies).

Tibet also gets separate country status in Aoki, which we are much more familiar with, but the movement to separate E. Turkestan, as it is alternatively spelt, from Chinese imperialism is also a fascinating story. Here's one website for starters, based in Virginia: **http://**

***All times UTC; All frequencies kHz; * before hr = sign on, * after hr = sign off; // = parallel programming; + = continuing but not monitored; 2 x freq = 2nd harmonic; sesqui = one and a half; A-09=spring/summer season; [non] = Broadcast to or for the listed country, but not necessarily originating there; u.o.s. = unless otherwise stated***

**eastturkistangovernmentinexile.us/**

If we are prepared to accept Tibet and Taiwan as separate from China, perhaps we should also grant at least radio-country status to East Turkistan? HFCC lists coordinates for Kashi as CHN 39N30 076E00, which are close, but not matching the Kashi-Saibagh 2022 version in Aoki. Not much can be found by Googling Saibagh, aside from SW frequency listings, but one Japanese site does connect it historically with Kashgar, which is another name for Kashi (gh)

Fantastically pleased I am to see East Turkistan mentioned as such in *WORLD OF RADIO*. Good on ya! Awareness is definitely improving. DXing ET definitely made me start investigating and reading about the area and coming to care about it. I remember when there used to be a Uighur station on 5440 and I couldn't believe that something that sounded like that could be in any way "Chinese" (Tim Bucknall, England, *DXLD*)

Xinjiang PBS, Urumqi, moved to summer frequencies from May 14; the Uighur language service at 2300-1800 (except siesta Tue/Thu 0800-1100): 13670 0230-1400; 7205 2300-0230, 1400-1800; 11885 2300-1800; 9560 0300-1200; 6120 2300-0300, 1200-1800; 7275 2300-1800 (Hiroshi via S. Hasegawa, NDXC) There are separate services in Chinese, Kazakh, Mongolian and Kyrgyz – all controlled, of course by the faraway Beijing government (gh)

***ECUADOR*** After seven and a half months of announcing a defunct frequency, 21455, every quarter hour on its morning Spanish broadcasts until 1500, HCJB finally fixed its automated IDs in mid-May, to reflect reality, only on 11690 and 11960 (gh)

***FRANCE*** Trade unions at RFI began another strike May 12, causing most SW programming to be replaced by music fill, which lasted most of the following week. They were objecting to plans to lay off 20% of RFI's employees and shut down services in German, Polish, Romanian, Albanian, Laotian and Serbo-Croatian; and four others would be moved online-only despite internet censorship in the target countries: Persian, Chinese, Russian and Vietnamese (RFI via kimandrewelliott.com)

RFI's French service has some of the best and most timely newscasts of any international broadcaster. Newscasts and longer news programs are never repeated, unlike many other broadcasters. RFI consistently has solid details on breaking news as well as insightful reports from correspondents. RFI's news is leagues ahead of the watered-down news on France 24 and TV5. That's why it's so objectionable to see RFI's budget pillaged to pay for TV channels that have meager offerings and much smaller audiences (Mike Cooper, GA, *DXLD*)

***INDIA*** AIR National Channel, via 9425 Bengaluru after 1430 news in English, also announced as on 9470, inaudible here, follows with English conversations on M/W/F until 1500, regular program of *Vividh*(?). One of them was "Leadership in Education," another about "Understanding Ragging" (Ron Howard, CA, *DXLD*)

6775 at 2130 speech, terribly distorted, sudden shifts to 6773, 6772, Indian accented English by the intonation, which matched AIR on 7410, external mixing spur? (Carlos Gonçalves, Portugal, *DXLD*) Delhi 7410 closes at 2230; should be a symmetrical spur around 8047/8048 (Wolfgang Büschel, Germany, *ibid.*)

Checking through reception reports of AIR's European DRM service on the *drmrx.org* forums, there are several mentions of hum, distorted sound, low audio, intermittent screeching noises and over-modulation. A poster in Switzerland reads: the muck they are transmitting now at 2030 probably makes no sense to the people who speak the languageeither (Mike Barraclough, England, World DX Club *Contact*)

***INDONESIA*** [and non] VOI was reliably heard in English at 1300-1400 for months on 9525, but missing May 3. On May 4 we confirmed they had made a sudden switch to 11785, colliding with Chinese jamming and VOA Chinese via Thailand, totally blocked on weekends by WHRI/Hmong Lao Radio. After 1400 when VOI is in Malay, there was less QRM, only from BBC Hindi to S Asia on 11785.

Meanwhile 9525 remained empty; we e-mailed VOI begging them to return there, and finally on May 13 they took our advice and resumed 9525 at least between 1200 and 1500. That again collides with China in Russian from 1357, but the English hour is clear. Week after week in April, the Tuesday broadcasts were joint productions with RRI Banjarmasin, Kalimantan, which left SW long ago (gh)

***KOREA NORTH*** [non] After two weeks on 6120, Shiokaze/Sea Breeze from JSR Japan, went back to 5910 in mid-April for the *1400-1430* broadcast: April 15 in Korean with piano music in background; fair to good reception, another clear frequency, a good solution to jamming by N. Korea. Just change frequency before any jamming is used. Most listeners know they stay in 49m band, so not difficult to re-locate them. English usually appears on Fridays, sometimes Wednesdays. "This program is broadcast by the Japanese private organization COMJAN, which has been investigating missing Japanese" (Ron Howard, CA, *WORLD OF RADIO*)

***LAOS*** Lao National Radio, 4412.7, 1041, low modulation but solid S7 signal. Nice local music with occasional talk by a woman. Next day on 4412.646 at 1107, and much stronger with full modulation. News read by woman to 1110, then local music (David Sharp, NSW, Australia, *DXLD*)

Later same day as first log above, 4412.61v, LNR Sam Neua, 1222-1233*, talk in vernacular // 6130 till sign-off announcement and choral national anthem (*Pheng Xat Lao*); both frequencies about equal strength; 6130 continued on (Ron Howard, CA, *ibid.*)

***NETHERLANDS*** [non] 9650, CRI at 1300-1400 via Sackville in English, 250 kW aimed 240 degrees rather close to my azimuth, puts in a big reliable signal, but ever since A-09 began, has considerable co-channel QRM from R. Netherlands in Dutch via Philippines, despite the latter supposedly aimed 200 degrees from Tinang. Serves the Chinese right for all their deliberate blockage of Western broadcasts into China, to get creamed by this unintentional collision!

RN is registered only at 1300-1327 but after the Dutch NA until 1327, switches to English until cut off at 1330* sharp. IBB fails to match the exact times it should be relaying RN, QRMs CRI for two more sesquiminutes (gh)

RN Spanish at 1100 heard on 6165 and 5645 (José Elías Díaz Gómez, Venezuela, *condiglist* yg) 5645? That's a leapfrog mixing product 260 kHz over another transmission from Bonaire on 5905, DW in German (gh)

***NIGERIA*** UnID transmitter firing up at 0419 on 6024.966 and slowly fading down to 6024.952 kHz. Carrier only, too weak for audio, slight peak from 0530 and fading rapidly from 0630, into noise floor by 0700. Could this be FRCN Enugu? (Brandon Jordan, TN, Perseus SDR, *DXLD*)

6024.97, 0307-0330, carrier on low side of 6025, below threshold level till one night sounded like African chanting/singing (similar to reciting from the Qur'an, but don't think it was). Too weak to ID language. Clearly not Bolivia. Brian Alexander also heard an unID here at 2120-2210 and wondered if it was Enugu (Ron Howard, CA, *ibid.*)

Enugu has certainly been back on air for some time. I checked 6025 at 2059 just in time to hear Enugu join the service of Radio Nigeria for the Network News at 2100 (parallel to Kaduna on 4770).

The "national station" in Ilorin (6050) has been inactive for many years and I have not heard the Abuja station (7275) for a long time either (James MacDonell, Niger State, Nigeria, *ibid.*)

Great news, and many thanks to James for the confirmation. I initially suspected this was Enugu from the start, due to fade-out pattern of the carrier. One night I was able to make out drumming at 0425 and talk by man in what sounded to be heavily accented English from 0430 (Brandon Jordan, TN, *ibid.*) Enugu is really in BIAFRA, unlike the clandestines on 17520, 12050; see last month (gh)

[non] 15215, Aso Radio International, *1600-1630* flute/drum opening, then Hausa talks and commentaries; good on peaks but QSB. Via Samara (John Wilkins, CO, *Cumbre DX*) M-F only

***NORTHERN MARIANA ISLANDS*** By late April, middle-of-the-night openings on 19, 16 and even 13 meters were happening from R. Free Asia, Saipan and Tinian sites in Chinese, around 0500-0600+ on 17615, 17880, 21550. Worth checking in NAm even if you think the bands must be closed. RFA transmissions are deliberately offset by 1-2 seconds to even out power consumption. Watch out for ChiCom CNR-1 jamming, which may have much quicker echoes on a single frequency (gh, OK)

***PAKISTAN*** DST change of UT +6 lasts until Oct 31, says **timeanddate.com** so SWBCs should be one UT hour earlier: (gh) R. Pakistan news in English heard 1000-1004 on 15100 and 17835; and 1500-1515 on 9385, 11565 (Mauno Ritola, Finland, *WORLD OF RADIO*)

Owing to some problem in the Radio Pakistan external service studios, whenever background music is played during announcements, it suppresses the audio and one is unable to know what is being announced. Most of the background music and signature tunes are very unpleasant and annoying. But the most horrible piece of music is Radio Pakistan's interval signal which can be used to frighten children. There is need to make it soft and subtle as was done for the national anthem (Aslam Javaid, Lahore, Pakistan, *ibid.*)

***PERÚ*** La Voz de las Huarinjas, Huancabamba, 5059.2, at 2350-0040 with folk music, ads for *curanderos* and botanical pharmacies; reactivated mid-April after several weeks off, closing at 0204* (Rafael Rodríguez R., Colombia, *condiglist* yg) 5059.35, tentative LV de las Huarinjas, at 2353-0022; brief flute music bit at 0003 (Scott R. Barbour, Jr., NH, *DXLD*) 5059.43v, same at 1025 to 1055 fade with mentions of Jaen, Universidad de San Marcos, **www.unmsm.edu.pe/** also at 0000 to 0058. Another day on 5059.16 at 0030-0058 (Bob Wilkner, FL, *ibid.*)

R. Nueva Súper Sensación, Huancabamba, 6536 at 0050-0120* with greetings and musical dedications, lengthy florid ID (Rafael Rodríguez R., Colombia, *condiglist*)

***RUSSIA*** VOR English to NAm made some further adjustments, adding 15425 at 0200-0400 via Far East, besides 0400-0600 13775, propagating better in summer than initially, the only frequency for us during those two hours.

9665 via Moldova stays in English until 0400, then Spanish, but the 0300 hour is ruined by co-channel from China via Brasil in Spanish, a collision that has been ongoing every summer for years, worse than at 0100-0200 since the Brasília beam is more toward NAm at 0300. The two are about 12 Hz apart producing a fast SAH, and Brasil sometimes goes haywire with distortion and spurs.

9480 appears on some versions for VOR English at 0000-0300 but unconfirmed; if it were really on via Germany as last summer, it would be very good. Meanwhile, VOR Spanish merits a French Guiana relay at 0100-0500, changed from 7395 to 9735.

VOR's 24-hour English program grid; you find the frequencies: **www.ruvr.ru/main.php?lng=eng&w=225&p=** (gh)

VOR heard on strange 8886 at 1800, how come? (Thorsten Hallmann, Germany, *WORLD OF RADIO*) Smacks of a MW/SW A+B or B-A mixing product. Who can figure it out? (gh) 9615 minus 729, Radio Zvezda in Samara mixing with Samara SW transmitter, and should also be on 10344 (Jari Savolainen, Finland, *ibid.*) Fits: 9615 Samara with VOR before 1800, YFR afterwards (gh) Yes, at 1700 both 8886 and 10344 with VOR Polish and R. Zvezda audio mixing // 1440 (Savolainen, *ibid.*)

***SAINT HELENA*** Radio St. Helena Day QSL cards were all in the mail by May. As of February, the top numbers of reports came from: Japan 124, USA 35, Germany 33, UK 15, Italy 12, Spain 9, Sweden 7.

The cards were processed by the wife and daughters of Gary Walters, RSH Station Manager, stamps hand canceled at post office (via Robert Kipp, *DXLD*)

***SAUDI ARABIA*** I really don't understand why BSKSA simply don't turn the buzzy Riyadh transmitter OFF, since probably it can't be repaired, and the audio is unreadable. Here is the "schedule" I have been monitoring between 0600 and 2300; all are 295 degrees except 15435 at 320: 0600-0900 17730, 0900-1200 17805, 1200-1500 21505, 1500-1800 15435, 1800-2300 11915 (Dragan Lekic, Serbia, *DXLD*)

***SERBIA*** The Trade Union at International Radio Serbia posted a multi-lingual notice on the IRS website that irregular financing and budget reductions threaten the existence of the station; IRS had no info on exactly what budget it had to work with for the rest of the year, but monthly funds were reduced by 12% compared to last year. It appealed for listener support by e-mail to *radioju@sbb.rs* (via Luigi Cobisi, DSWCI *DX Window*)

***SIERRA LEONE*** [non] Cotton Tree News, via VTC 15220 daily at 0730-0800 changed site from Rampisham, to: Skelton, 300 kW at 195 degrees (gh) Heard at 0740 with interview, fair-good signal (Luca Botto Fiora, Italy, *playdx* yg)

***SINGAPORE*** [non] AWR Asia/Pacific will relocate to Batam, Indonesia come June 2009. From then on, the headquarters also decided to discontinue *Wavescan*, and along with it, the listener relations department (Rhoen Católico, *Wavescan*, via Salahuddin Dolar, Bangladesh, *DXLD*)

Beginning in the first week of June, *Wavescan* will be written and produced in the United States for broadcast worldwide. Scripts will be researched and written in Indianapolis, Indiana, and the program assembled and produced in the Miami, Florida, studios of WRMI/Radio Miami International (Adrian Peterson, AWR press release via Jeff White, WRMI)

Adrian Peterson will be entirely in charge of the content, but segments of regional DX news will continue to come from *Wavescan* correspondents in several Asian countries. We are glad to play a small part in the new version of *Wavescan*. As of June 7, WRMI broadcasts *Wavescan* on 9955: Sun 0830, 2130; Mon 1530*; Tue 0015, 0500, 1130; Wed 1130; Fri 1430*; Sat 0130, 0730. *These transmissions are specifically beamed to North America. And *Wavescan* will continue to be broadcast over the other stations in the AWR network (Jeff White, WRMI, *WORLD OF RADIO*)

***SOLOMON ISLANDS*** SIBC was widely reported in April and May, varying slightly around 9541.50, with BBCWS relays heard around 1230-1500 and at times almost // 9740 Singapore (Ron Howard, CA, and gh, *DXLD*) Sometimes it would overcome China on 9540 or Cuban jamming against nothing on 9545 (gh)

At earlier hours with local programming, such as 0511 easy listening music, few announcements on 9541.552 per Perseus; another day around 0630, parliamentary broadcast on 9541.538 (Walt Salmaniw, BC, *DXLD*) 9541.53, at 0756 program summary, 0759 ad, ID, 0800 news, many local messages to 0858 (Dave Valko, PA, *HCDX*) 0859 English, 0902 Pidgin, 0914 local music, 0916 English religious talk (Brian Alexander, PA, *DXLD*)

***SOMALIA*** Sam Voron's website **https://sites.google.com/site/somaliahamradio/** mentions new SW station, Radio Hage, from Galkayo with 1.25 kW on 3980 and 6915 at 0900-1000 and 0300-0500 (Jari Savolainen, Finland, *DXLD*) Tried at 0345, but only heard WYFR in English (Anker Petersen, Denmark, *playdx* yg) WYFR on 6915 at 0300-1200, a bit of a problem (gh)

The Radio Hage site is located to the far north of Galkayo in a new building constructed in 2006 (Ian Baxter, *shortwavesites* yg) Address is: *radiohagesom@gmail.com* (Anker Petersen, DSWCI *DX Window*) Reply from R. Hage, 6915 said they have been off the air for three days but hoped to be back, 03-04 and 09-11 UT (Don Durham DX report, RNZI *Mailbox*)

***SUDAN*** SRTC, 7200 *0239-0320+, abrupt sign on with Qur'an, Arabic talk at 0253. Possible radio-drama. "*Huna Omdurman*" IDs, ads, and chirping birds. Fair to good but occasional ham QRM.

The next day [UT Sunday] abrupt sign on was late at *0320 until 0432*. Rustic local folk music. Time pips at 0401:40 and possible news (Brian Alexander, PA, *DXLD*)

***TAIWAN*** RTI Japanese service on 9735 between 1300 and 1400 is usually clean but on occasion such as April 20, 22, May 16, puts spurs on neighbors CRI 9730, BBC 9740. The spurs make almost the same matching pitch but not a pure tone het (gh, OK)

***THAILAND*** 15275, R. Thailand, *0000-0233, general format observed two evenings in April: *0000 to 0029 English with live *News Hour*, local time-checks; open carrier while they changed the antenna; 0030 continued with news, better reception after antenna change; 0102 into Thai; 0159 open carrier while again changed antenna; 0200-0230 a relay/repeat of the first half of the earlier one-hour news program in English; 0230 into Thai (Ron Howard, CA, *DXLD*)

R. Thailand in Thai at 1330-1400 on 9455 was getting slightly off-frequency QRM in late April and early May from another Asian language, which turned out to be YFR relay via Taiwan in Vietnamese. Taiwan transmissions are forbidden by China to appear in HFCC, so IBB, which handles frequency management for NBT Thailand, may have assumed there would be no collision. If one actually monitored the channel as far away as Oklahoma, or consulted the unofficial Aoki list, one learnt the truth. Perhaps IBB should get together with the YFR frequency manager. I notified YFR about this, and per Aoki on May 11, they moved off to 9960 during this hour, clearing Thailand (gh)

***TIBET*** Xizang PBS had made the switch from 7125/7170 to 7255/7450 on May 8 at 0100 but Xinjiang remained on 7120/7155/7195 (Olle Alm, Sweden, *DXLD*) See EAST TURKISTAN

[non] V. of Tibet, between 1300 and 1400 one week in April was on 15412. The next week it was on 15422 (Kouji Hashimoto, *Japan Premium*) Via Dushanbé, Tajikistan (Aoki) Later in May at 1324, CVC Chile 15410 had a good het from 15412, presumably this which moves around to avoid ChiCom jamming (gh)

***TURKEY*** VOT, 9830, English to NAm at 2200-2250 suffers from persistent RTTY QRM on exactly the same frequency, so can't be escaped. This is not surprising, since the RTTY intruder has been there for years, and broadcasters should avoid the frequency. We notified TRT about this, suggesting they shift to open 9835, but two weeks later nothing had been done (gh)

***U S A*** The latest Federal Human Capital Survey, conducted by the Office of Personnel Management, has been published in Washington. In a poll of employees in 37 US federal agencies, the Broadcasting Board of Governors (BBG) came in last place in three of four categories – leadership and knowledge management, results-oriented performance, and talent management. The broadcasters did manage a 36th-place showing in job satisfaction. To make matters worse, the agency dropped in each of the categories from the previous survey (*Washington Post* April 23 via *Media Network* blog)

The working environment is not always pleasant. While most agencies have regular office hours, many VOA broadcasters and studio personnel must work evenings, overnights, or 3 to 11 a.m., in which case they must move their cars from the parking lot at 8 a.m. to make room for the senior executives' cars, then look for metered spaces on the streets, and keep those meters fed until quitting time (Kim Andrew Elliott, kimandrewelliott.com) See his April 29 blog entry for full comment

VOA has a quite extensive spare broadcasting facility at an apparently classified location outside Washington, maybe even in an underground shelter: Continuity of Operations (COOP) – Engineering continued to support the BBG disaster recovery plans to enable the Agency to continue essential broadcast mission functions in the event of catastrophic network loss of its main telecommunications and program production complex in Washington, D.C. The BBG, in July 2007, successfully and fully tested alternate radio broadcasting facilities and an associated major COOP telecommunications hub at a remote location outside of Washington, D.C. Training exercises for VOA radio programming staff conducted at the COOP site in August 2007 confirmed that these radio broadcast facilities and supporting communications can be set up and fully operational within 12 hours as required by Federal regulations. These COOP facilities can support radio operations in 10 of VOA's highest priority languages.

In FY 2007, Engineering initiated plans to install a shortwave broadcast capability operating on the region's widely used tropical bands at the OCB's transmitting facility in Marathon, Florida. Work continues at the BBG's Greenville Transmitting Station to convert a medium wave transmitter, originally used at the closed BBG station in Belize, for these shortwave (tropical band) broadcasts from Marathon. In FY 2008, Engineering is installing a transmitter and basic antenna system to support broadcasts to Cuba (BBG FY 2009 budget request **www.bbg.gov/reports/budget.html** via Kai Ludwig, *DXLD*)

Whoopee, the DentroCuban Jamming Command will be coming to the tropical bands. Maybe IBB should put Martí on 5025 (gh)

The 2010 budget proposal would eliminate VOA Hindi, Croatian, and Greek language broadcasts and close a finance office located in Paris. While the overall funding level for VOA is increasing from 2009, the administration says, funding related to these language services within VOA will be reduced from about $3 million to $1 million." *Federal Eye, Washington Post*, via kimandrewelliott.com)

Any station picking a frequency only 10 kHz from WEWN is asking for trouble; at least one WEWN transmitter puts out dirty spurs 10 kHz each side, which make a squealing beat against the neighbor. WYFR is such a victim in two cases we have monitored: 15600 WYFR and 15610 WEWN are both on air between 1900 and 2300; 11520 WEWN and 11530 WYFR are both on air between 0400 and 0900 (gh)

AWR *Wavescan* production moved to WRMI: See SINGAPORE [non]

Ted Randall interviewed me for his *QSO* show in May; it aired several times on WBCQ, WRMI, and is available here:

**www.tedrandall.com/media/podcat/qso-05-12-09.mp3** (Glenn Hauser)

[non] Update to one of last month's lead items: CVC A Sua Voz, Brazilian service from Miami via Chile, did not close April 30, but was extended until June 30. However, instead of merely closing SW and continuing on satellite and internet, it was announced in mid-May that the entire service would be closed down, and the staff in Miami had been given notice (via Célio Romais, who was involved in their DX program, *DXLD*) See if you still hear it all day on 15410 until June-end. Brazilian AM, tropical and SW radio dials are full of plenty of religious broadcasters already (gh)

***URUGUAY*** Radio Sarandí Sport planned to reactivate SW on 6045-LSB in mid to late May with 3 kW PEP (Horacio Nigro, *WORLD OF RADIO*) Not confirmed at press time; if so it would be the only active Uruguayan SW station, and still a tough catch, especially if limited to daytime (gh)

*Until the Next, Best of DX and 73 de Glenn!*

# BROADCAST LOGS

## NOTEWORTHY LOGS FROM OUR READERS

*Gayle Van Horn, W4GVH*
*gaylevanhorn@monitoringtimes.com*
*http://mt-shortwave.blogspot.com*

**0044 UTC on 3249.9**
HONDURAS: Radio Luz y Vida. Spanish religious programming. Musical ballad at 0049. Announcers over music with brief news bits and station ID at 0058. Honduran **HRMI** via Comayaguela 3339.98, 0935-1005. Easy-listening ballads to ID announcement at 0958. Fair signal quality (Scott Barbour, Intervale, NH).

**0203 UTC on 6184.95**
MÉXICO: Radio Educación. Mexican ranchera music. Contact address given and, "Why don't you comment and send a reception report to Radio Educación?" Station address: "P.O. Box 44277, CP 03100 Mexico City" (Ron Howard, Asilomar Beach, CA). **Radio Mil** 6010, 0755-0830. *Musica de Mexico* segment to "Radio Mil" identification. Spanish text interspersed with great Spanish vocals to 0830 tune-out. Strong signal, no fading (Bruce Barker, Broomhall, PA). Radio Mil 6010, 1013-1034 (Barbour, NH).

**0320 UTC on 11780**
BRAZIL: Rádio Nacional do Amazonia. Portuguese program format to promos. Brief music breaks to station abruptly pulled plug in mid sentence. Station's sign-off time routinely varies. Signal fair-good (Brian Alexander, Mechanicsburg, PA). Additional Brazilian stations in Portuguese unless otherwise indicated: **Rádio Brasil Central** 4984, 0441 (Joe Wood, Greenback, TN). 4985, 0744-0755 (Barker). **RD Macapa** 4915, 0620-0650 (Wood). **Rádio Clube do Para** 4885, 0705-0715; **Rádio Diffusora de Macapa** 4915, 0815-0825; **Rádio Voz da Missionaria** 9665, 0845; **Rádio Nacional da Amazonia** 8185.22, 0905-0915 (Barker). **Rádio Bandeirantes** 9645.8, 2225-0005; **Rádio 9 de Julho** 9818.916 (Spanish) 2225-0052 (Brandon Jordan, Memphis, TN/Cumbre DX). **Rádio Record** 6150, 0945-1000; **Rádio Senado** 5990, 1003-1015 (Chuck Bolland, Clewiston, FL). **Rádio Inconfidencia** 6009.72, 2235-2305 (Alexander).

**0810 UTC on 6075**
RUSSIA: Radio Rossii. Station via Petropavlovsk-Kamchata. Prior to 0810 carrying Radio Rossii network programming // to 5935, 7200 and 7320. Switched to local/regional program beginning with ID as "Radio Rossii Kamchatka." Russian vocals and ballads to "this is Kamchatka" ID and local news to interviews (Howard). **Voice of Russia** 9890, 2235; 15605, 1410. (Bob Fraser, Belfast, ME). VOR via Khabarovsk 7300, 1000 (Barbour). **GTRK Magadan** (tentative) 7320, 0210-0300. All Russian and US pop music to brief announcers' break. No sign-off prior to joining Radio Rossii network programming at 0300 (Howard).

**1038 UTC on 3385**
PAPUA NEW GUINEA: Radio East New Britain [Rabaul, New Britain]. Pidgin text and conversation to advertisements. Station promos to local ballad at tune-out. Signal fair at best. This station has been the most reliable PNG to hear over the past years. Additional PNGs monitored in Pidgin: **Radio Northern** [Popendetta], 3345, 1038-1050 fading under band noise by tune-out (Barbour). **Radio West New Britain** [Kimbe, New Britain] 3235, 1239-1246; **Radio Southern Highlands** [Mendi, New Guinea Territory] 3275, 1240; **Radio Bougainville** [Bula. Bougainville Island] 3325, 1241-1254 (tentative); **Radio East New Britain** 3385, 1243-1249; **Radio New Ireland** [Kavieng, New Ireland] 3905, 1243-1245; **Radio Milne Bay** [Alotau, PNG] 3365 (presumed) 1210-1218. Signal very weak (Jim Evans, Germantown, TN).

**1122 UTC on 9525**
INDONESIA: Voice of Indonesia. Tune-in to language lesson (possibly Chinese) program to 1123. Program announcements to musical bridge and featured music program. Signal fair. VOI 9524.98, 1301-1402 (English/Malay) (Alexander). 9525 [English] 1330-1404, 1502-1506* (Howard). Additional Indonesians stations monitored: **RRI-Jakarta** 9680, 1130-1150 (Bolland). **RRI-Palangkaraya** 3325 [Bahasa] 1210-1220. Poor signal running // to slightly stronger RRI-Manokwari 3987.05. **RRI-Fak Fak** 4790, 1215-1235. Noted // to Manokwari prior to 1220.Poor signal with CODAR interference peaking at 1225. **RRI-Biak** (tentative) 4919.98, 1225-1235. Signal peaking around 1235 in Bahasa. Log very tentative, but likely Biak as conditions favorable for several Indo's heard. **RRI-Pontianak** 3976, 1244-1250 (Evans).

**1240 UTC on 15210**
ROMANIA: Radio Romania International. Feature on Romanian religious celebrations. SIO 454 (Fraser). 6015, 2340-2359. *Mailbox* program at tune-in, including listeners' letters and Romanian music. Station ID to resuming letters, amid good signal quality, 6135, 0003-0015 (Bolland).

**1250 UTC on 15450**
TURKEY: Voice of Turkey. Program, *Istanbul-A Capital of Culture*. SIO 554. 9785, 1845. Review of the *Turkish Press*. SIO 555 (Fraser). VOT 7205, 2030-2055; 9830, 2212-2240 (T.J. Banks, Dallas, TX).

**1400 UTC on 6120**
CLANDESTINE: Shiokaze. Sign-on to Korean talks. Good signal but noisy band. **Furusanto No Kaze** 9965 (Korean/Japanese) ID, "Ilbono bangsong Furusato No Kaze," 1550-1557* (John Wilkins, Wheat Ridge, CO).

**1435 UTC on 6010**
TIBET: CNR-11 (Tibetan service). Jamming noted on 6003 causing interference to this English programming (1430-1500). Hard to monitor when jamming is so strong. Noted 6010, 1423-1447 on subsequent monitoring. English in progress at check with discussion on Tibetan music. Signal fair-poor amid jamming on 6003. 4 (Howard). **PBS Xizang** via Lhasa 4920 [Tibetan] 1155-1210 Good signal at 1200 // 4905 weaker (Evans).

**1458 UTC on 17770**
SOUTH AFRICA: Channel Africa. Couple of minutes with good audio signal and "Channel Africa" ID on the hour, followed by newscast. **VOA** relay 17750, 1455-1500. **Radio Sondergrense** 3320, 2350-2359 in possibly Afrikaans (Bolland). Channel Africa 15235 at 1732 with report on meningitis outbreak in Nigeria. SIO 453 (Fraser).

**1624 UTC on 15140**
OMAN: Radio Sultanate of Oman [Thumrait]. Presumed this station in Arabic. Music to announcement and news format. Music resumed at 1641. Signal initially good despite fading, deteriorating badly. Haven't heard Oman in over a year (Evans).

**1649 UTC on 15190**
EQUATORIAL GUINEA: Radio Africa [Bata]. Religious prayer to closing announcements for Tony Alamo Ministries program. Opening hymn at 1651 prior to next fundamentalist segment. Initial audio slightly low, improving despite distortions observed. Strength poor-good with fading (Evans). 15190, 2052-2103. Religious text to 2100, signal poor-fair (Barbour). **Radio Nacional-Malabo** 6250, 0521-0610. Euro pops to Spanish announcements to "Radio Nacional" and "Radio Malado" identifications at 0608. Good signal, not // with 5005. (Alexander).

**1720 UTC on 15790**
CYPRUS: BBC Darfur Salaam, Zyyi (presumed). Arabic chat via announcer, followed by music program. Additional announcements to music, signal gone by 1728. Very poor signal barely above the noise threshold (Evans).

**1830 UTC on 15210**
NIGERIA: Voice of Nigeria. News covering Africa including coverage on meningitis outbreak in Nigeria. SIO 453 (Fraser). Noted on 7255, 2144-2200. French comments noted at tune-in over African highlife tunes. Closing remarks at 2157 to fanfare music and drums signal at 2158. Station ID followed by Hausa service (Bolland).

Additional logs excluded for space constraints are posted as **Blog Logs** on the *Shortwave Central* blog at the above web address.

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Additional loggings excluded for space constraints are posted as **Blog Logs** on the **Shortwave Central Blog** at the above web address.

*Thanks to our contributors – Have you sent in YOUR logs?*
*Send to Gayle Van Horn, c/o Monitoring Times*
*English broadcast unless otherwise noted.*

# THE QSL REPORT

**VERIFICATIONS RECEIVED BY OUR READERS**

*Gayle Van Horn, W4GVH*
*gaylevanhorn@monitoringtimes.com*

## Holiday DXing for a Sizzling July

Here is a tip you may not have thought about when planning your listening sessions. All countries have national holidays, but have you considered listening to them on their special day or holiday? Listeners may find special programming or extended broadcast hours to honor that special day, holiday or event. Many DXers take advantage of this excellent opportunity by sending reception reports for the particular country on the special holiday.

Don't forget to mention in your station correspondence any special event or holiday you may have heard mentioned. One of our regular contributors received a special card and souvenir from Radio France International, for programming monitored during their national *Bastille Day* on July 14. Listeners outside the United States monitor *Voice of America* on July 4, as our nation celebrates its *Independence Day* with special programming. QSL Managers or other staff members always appreciate your interest in their country, and may send some extra memorabilia your way.

To learn more about holiday DXing, including month-by-month listings of national holidays and independence days, tips, addresses, websites, email contacts and mastering the art of QSLing the world, you can purchase *World QSL Book* on CD-Rom available from Grove Enterprises or Teak Publishing at *teakpub@brmemc.net*

**July Bits and "Bytes"**

- Brazilian station Rádio Senado (5990 kHz), welcomes reports with return postage to: Praça dos Três Poderes, Anexo II-Bloco B-Térreo, 70165-900 Brasília DF, Brasil.
  Streaming audio www.senado.gov.br/radio/ondasCurtas.asp. Rádio Rio Mar (6160/9695 kHz) replies to Portuguese correspondence with $1.00 US or mint postage, addressed to: Walter Gutierrez, DirectorTecnico, Rua José Clemente 500, Centro, 69010-070 Manaus AM, Brasil.
  Streaming audio www.riomaronline.com.br/2009/
- Radio Dabanga, an independent station broadcasting in vernacular languages to Darfur, with the support of the Dutch NGO Press Now, has added English translations of their news items on their website at www.radiodabanga.org. Brokered by Germany's Media Broadcast on 7315 // 9830, 13800; 0429-0527 UTC. Program details to: Radio Darfur Network, Press Now, Witte Kruislaan 55, 1217 AM Hilversum, Netherlands. Email: *radiodabanga@yahoo.com* (or) Media Broadcast, Michael Puetz, Frequency Manager *michaelpuetz@media-broadcast.com* (or) *qsl-shortwave@media-broadcast.com*
- Radio Hage, a new Somali shortwave station operating from Galakayo has been reported on 3980 // 6915 kHz at 0900-1000 and 0300-0500 UTC. The email contact is *radiohagesom@gmail.com*. Radio Hargeisa the national radio of Somaliland is operating on 7145, 1605-1901 sign-off. English correspondence is accepted and return postage of $1.00 Europe, $3.00 elsewhere, directed to: c/o Konsularische Veretung Somaliland, c/o Baldur Dronica-DJ6SI, Zedernweg 6, D-50127 Bergheim, Germany.
- Euro-pirates, Radio Borderhunter, 6210, full data card in 12 weeks. E-report to: *borderhunter@hotmail.com* Radio Lowland, 6310, full data E-QSL in six weeks for E-report to: *radiolowland@hotmail.com* (A. Fernández Llorella, Spain/playdx2003).
- Voice of Asena, an opposition station brokered from TDP-Belgium, broadcast to East Africa (Mon-Wed-Fri) in Tigrinya on 9610, 1730-1800 UTC. English confirmation letter received from Director/Founder Amanuel Eyasu. Website www.assenna.com Email *aseye.asena@googlemail.com* (Bjoern Fransson, Gotland, Sweden/WWDXC Top News) Transmitter Documentation Project (TDP) Ludo Maeus-Managing Director, P.O. Box 1, B-2310 Rijkevorsel, Belgium. Email *info@transmitter.org*
- Radio Free Asia, considered a "quasi-clandestine," broadcasts news and information on shortwave to listeners in Asian countries lacking access to fair and balanced news reporting from their domestic media. RFA issues QSL card series throughout the year. In recent months, RFA focused on *The Year of Ox*, and *Musical Instruments of Asia*. New series announcements are reported on the *Shortwave Central Blog* at http://mt-shortwave.blogspot.com/. For information, schedules and online reception reports, go to www.techweb.rfa.org and follow the QSL Reports link. Reception reports are also accepted by email to *qsl@rfa.org* or postal address: Radio Free Asia, 2925 M. Street NW, Suite 300, Washington, DC 20036 USA.

**BELARUS**

Radio Station Belarus 7135 kHz. Handwritten, full data card signed by Larisa Suarez. Received in 64 days for an English report. Station address: 4 Krasnaya St., Minsk 220807 Belarus. (Harold Woering, Easthampton, MA).

**COLOMBIA**

Radio Marfil Estereo 5910 kHz. Email verification for English details in 40 minutes via Rafael Rodriguez *rafaelcoldx@yahoo.com* Postal address confirmed from veri signer as: La Voz de Conciencia, Colombia para Cristo, Calle 44° No. 13-67, Local 1, Barrio Palememo, SF de Bogotá, Colombia. (Joe Wood, Greenback, TN).

**MEDIUM WAVE**

CBK 540 kHz. Full data CBC-Radio Canada antenna card, signed by Jennifer Bork. Received in 70 days for an AM report and mint stamps (used on reply). Station address: 2440 Broad Street, Regina, SK S4P 4A1 Canada (Bill Wilkens, Springfield, MO)

KHOJ 1460 kHz. *Heart of Jesus Radio.* Partial data confirmation on *Covenant Network* letterhead, signed by Joseph Adams-Office Manager. Received in nine days for an AM report, $1.00US and address label (used on reply). Station address: 3515 Hampton Avenue, St. Louis, MO 63139-1917 (Wilkins).

WHB 810 kHz. *Sports Radio 810.* Partial data red/white folder card, signed by Jason Justice. Received in seven days for an AM report, $1.00US and address label (used on reply). Station address: 6721 West. 121st Street, Overland Park, KS 66209 USA (Wilkins).

**MÉXICO**

XERTA-Radio Transcontinental de América 4810 kHz. Full data QSL card *Certificado de Sintonia* with station logo and national flags, signed by Rebén Castañeda Espindola-Director General, plus cover letter. Received in 88 days from last follow-up. Station address: Calle Gabriel Guerra #13, Col. Zona Escolar, C.P. 07230, Ciudad de México (John Wilkins, Wheat Ridge, CO).

**SÃO TOMÉ**

Affia Darfur/Radio Sawa via Pinheira 4960 kHz. Full data Pinheira transmitter site card, plus VOA calendar, and key chain. Received in two months. QSL address: Voice of America, 330 Independence Avenue, SW, Washington, DC 20237 USA (Wendel Craighead, Prairie Village, KS).

**SERBIA**

International Radio of Serbia, 6190 kHz. Full data transmitter/antenna card unsigned. Received in 130 for an English report and $1.00US. Station address: Hilendarska 2, 11000 Beograd, Serbia (Woering)

**UTILITY**

US Coast Guard Station NRV, Apra Harbor, Guam 8422 CW/SITOR. Full data verification letter, signed by Ryan S. Tolentiono. Received in 52 days for a utility report and $1.00US. QSL address: United States Coast Guard, Sector Guam, PSC 455, Box 176, FPO-AP 96540-1056, Guam. (Takahito Akabayashi, Japan/WWDXC-BC-DX Top News).

Additional QSLs, tips and information excluded for space constraints are posted at the *Shortwave Central Blog* http://mt-shortwave.blogspot.com/

# How to Use the Shortwave Guide

0000-0100 twhfa USA, Voice of America 5995am 6130ca 7405am 9455af

① ② ⑤ ③ ④ ⑥ ⑦

## Convert your time to UTC.

Broadcast time on ① and time off ② are expressed in Coordinated Universal Time (UTC) – the time at the 0 meridian near Greenwich, England. To translate your local time into UTC, first convert your local time to 24-hour format, then add (during Daylight Time) 4, 5, 6 or 7 hours for Eastern, Central, Mountain or Pacific Times, respectively. Eastern, Central, and Pacific Times are already converted to UTC for you at the top of each hour.

Note that all *dates*, as well as times, are in UTC; for example, a show which might air at 0030 UTC *Sunday* will be heard on *Saturday* evening in America (in other words, 8:30 pm Eastern, 7:30 pm Central, etc.).

## Find the station you want to hear.

Look at the page which corresponds to the time you will be listening. English broadcasts are listed by UTC time on ① , then alphabetically by country ③, followed by the station name ④. (If the station name is the same as the country, we don't repeat it, e.g., "Vanuatu, Radio" [Vanuatu].)

If a broadcast is not *daily*, the days of broadcast ⑤ will appear in the column following the time of broadcast, using the following codes:

| Codes | |
|---|---|
| s/Sun | Sunday |
| m/Mon | Monday |
| t | Tuesday |
| w | Wednesday |
| h | Thursday |
| f | Friday |
| a/Sat | Saturday |
| occ: | occasional |
| DRM: | Digital Radio Mondiale |
| irreg | Irregular broadcasts |
| vl | Various languages |
| USB: | Upper Sideband |

## Choose the most promising frequencies for the time, location and conditions.

The frequencies ⑥ follow to the right of the station listing; all frequencies are listed in kilohertz (kHz). Not all listed stations will be heard from your location and virtually none of them will be heard all the time on all frequencies.

Shortwave broadcast stations change some of their frequencies at least twice a year, in April and October, to adapt to seasonal conditions. But they can also change in response to short-term conditions, interference, equipment problems, etc. Our frequency manager coordinates published station schedules with confirmations and reports from her monitoring team and *MT* readers to make the Shortwave Guide up-to-date as of one week before print deadline.

To help you find the most promising signal for your location, immediately following each frequency we've included information on the target area ⑦ of the broadcast. Signals beamed toward your area will generally be easier to hear than those beamed elsewhere, even though the latter will often still be audible.

Target Areas
- af: Africa
- al: alternate frequency (occasional use only)
- am: The Americas
- as: Asia
- ca: Central America
- do: domestic broadcast
- eu: Europe
- me: Middle East
- na: North America
- pa: Pacific
- sa: South America
- va: various

***Mode used by all stations in this guide is AM unless otherwise indicated.***


### MT Monitoring Team

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*Thank You ...*

**Additional Contributors to This Month's Shortwave Guide:**

Rich D' Angelo/*NASWA Flash Sheet*, *NASWA Journal*; Arnie Coro/R Havana; Alokesh Gupta, New Delhi, India; Ivo Ivanov; Bulgaria; Evelyn Marcy/WYFR; Frank Hillton, Charleston, SC; Adrian Sainsbury/R NZ Intl; Rachel Baughn/MT; Jeff White/WRMI; Alan Roe, UK; José Miguel Romero, Spain; Daniel Sampson, Ernest Riley/PTSW; Jaisakthivel, Chennai, India; Mike Barraclough, UK; Harold Sellers, Canada/*ODXA*, *DX Listening-In*; Tom Taylor, UK; Sam Wright, Biloxi, MS; Wolfgang Büeschel, Germany/*WWDXC* BC DX, *Top News*; AOKI; *BCL News; Ardic DX Club*; *Cumbre DX*; *DX Asia*; *British DX Club*; EIBI; *HFCC; Hard-Core DX; DX Mix News*; *Play DX 2003; World DX Club/Contact.*


## Shortwave Broadcast Bands

| kHz | Meters |
|---|---|
| 2300-2495 | 120 meters (Note 1) |
| 3200-3400 | 90 meters (Note 1) |
| 3900-3950 | 75 meters (Regional band, used for broadcasting in Asia only) |
| 3950-4000 | 75 meters (Regional band, used for broadcasting in Asia and Europe) |
| 4750-4995 | 60 meters (Note 1) |
| 5005-5060 | 60 meters (Note 1) |
| 5730-5900 | 49 meter NIB (Note 2) |
| 5900-5950 | 49 meter WARC-92 band (Note 3) |
| 5950-6200 | 49 meters |
| 6200-6295 | 49 meter NIB (Note 2) |
| 6890-6990 | 41 meter NIB (Note 2) |
| 7100-7300 | 41 meters (Regional band, not allocated for broadcasting in the western hemisphere) (Note 4) |
| 7300-7350 | 41 meter WARC-92 band (Note 3) |
| 7350-7600 | 41 meter NIB (Note 2) |
| 9250-9400 | 31 meter NIB (Note 2) |
| 9400-9500 | 31 meter WARC-92 band (Note 3) |
| 9500-9900 | 31 meters |
| 11500-11600 | 25 meter NIB (Note 2) |
| 11600-11650 | 25 meter WARC-92 band (Note 3) |
| 11650-12050 | 25 meters |
| 12050-12100 | 25 meter WARC-92 band (Note 3) |
| 12100-12600 | 25 meter NIB (Note 2) |
| 13570-13600 | 22 meter WARC-92 band (Note 3) |
| 13600-13800 | 22 meters |
| 13800-13870 | 22 meter WARC-92 band (Note 3) |
| 15030-15100 | 19 meter NIB (Note 2) |
| 15100-15600 | 19 meters |
| 15600-15800 | 19 meter WARC-92 band (Note 3) |
| 17480-17550 | 17 meter WARC-92 band (Note 3) |
| 17550-17900 | 17 meters |
| 18900-19020 | 15 meter WARC-92 band (Note 3) |
| 21450-21850 | 13 meters |
| 25670-26100 | 11 meters |

**Notes**

Note 1 Tropical bands, 120/90/60 meters are for broadcast use only in designated tropical areas of the world.

Note 2 Broadcasters can use this frequency range on a (NIB) non-interference basis only.

Note 3 WARC-92 bands are allocated officially for use by HF broadcasting stations in 2007

Note 4 WRC-03 update. After March 29, 2009, the spectrum from 7100-7200 kHz will no longer be available for broadcast purposes and will be turned over to amateur radio operations worldwide

## 0000 UTC - 8PM EDT / 7PM CDT / 5PM PDT

| | | | | | | |
|---|---|---|---|---|---|---|
| 0000 | 0000 | | UK, BBC World Service | 5970as | 6195as | |
| | | | 7395as | 9410as | 9740as | 11955as |
| | | | 13725as | 15335as | 15360as | |
| 0000 | 0005 | | Canada, R Canada International | | 6100na | |
| 0000 | 0020 | | Japan, NHK World Radio Japan | | 5960eu | |
| | | | 6145na | 13650as | 17810as | |
| 0000 | 0027 | | Czech Rep, Radio Prague | 7345na | 9440na | |
| 0000 | 0030 | | Egypt, Radio Cairo | 11590na | | |
| 0000 | 0030 | | Thailand, Radio Thailand World Svc | | 15275na | |
| 0000 | 0030 | | USA, Voice of America | 7555as | | |
| 0000 | 0045 | | India, All India Radio | 9705as | 9950as | |
| | | | 11620as | 11645as | | |
| 0000 | 0045 | | USA, WYFR/Family Radio Worldwide | | 17805na | |
| 0000 | 0056 | | Romania, R Romania International | | 6135na | |
| | | | 9580na | | | |
| 0000 | 0057 | | Canada, R Canada International | | 11700na | |
| 0000 | 0100 | | Anguilla, Worldwide Univ Network | | 6090am | |
| 0000 | 0100 | | Australia, ABC NT Alice Springs | | 2310do | |
| | | | 4835do | | | |
| 0000 | 0100 | | Australia, ABC NT Katherine | 5025do | | |
| 0000 | 0100 | | Australia, ABC NT Tennant Creek | | 4910do | |
| 0000 | 0100 | | Australia, Radio Australia | 9660as | 12080as | |
| | | | 13690as | 15240pa | 17715as | 17750va |
| | | | 17775va | 17795va | | |
| 0000 | 0100 | | Canada, CFRX Toronto ON | 6070na | | |
| 0000 | 0100 | | Canada, CFVP Calgary AB | 6030na | | |
| 0000 | 0100 | | Canada, CKZN St John's NF | 6160na | | |
| 0000 | 0100 | | Canada, CKZU Vancouver BC | 6160na | | |
| 0000 | 0100 | | China, China Radio International | | 6020na | |
| | | | 6075as | 6180as | 7415as | 9570na |
| | | | 11790as | 11885as | 13750as | 15125as |
| 0000 | 0100 | | Germany, Deutsche Welle | 9885as | 15595as | |
| | | | 17525as | | | |
| 0000 | 0100 | | Guyana, Voice of Guyana | 3291do | | |
| 0000 | 0100 | | Malaysia, RTM/Traxx FM | 7295as | | |
| 0000 | 0100 | DRM | New Zealand, Radio NZ International | | 13730pa | |
| 0000 | 0100 | | New Zealand, Radio NZ International | | 15720pa | |
| 0000 | 0100 | vl | Papua New Guinea, Wantok R. Light | | 7325do | |
| 0000 | 0100 | | Russia, Voice of Russia | 9480sa | 9665sa | |
| 0000 | 0100 | | Spain, Radio Exterior Espana | 6055na | | |
| 0000 | 0100 | | Ukraine, R Ukraine International | | 7440na | |
| 0000 | 0100 | | USA, American Forces Network | | 4319usb | |
| | | | 5446usb | 5765usb | 6350usb | 7811usb |
| | | | 10320usb | 12132usb | 13362usb | |
| 0000 | 0100 | | USA, EWTN Vandiver AL | 11520af | | |
| 0000 | 0100 | | USA, WBCQ Monticello ME | 5110am | 7415am | |
| | | | 9330am | | | |
| 0000 | 0100 | | USA, WBCQ Monticello ME | 5110am | 7415am | |
| | | | 9330am | | | |
| 0000 | 0100 | | USA, WBOH Newport NC | 5920am | | |
| 0000 | 0100 | | USA, WHRA Greenbush ME | 5850eu | | |
| 0000 | 0100 | | USA, WHRI Cypress Creek SC | | 5875na | |
| | | | 7385na | | | |
| 0000 | 0100 | | USA, WINB Red Lion PA | 9265ca | | |
| 0000 | 0100 | | USA, WRMI Miami FL | 9955am | | |
| 0000 | 0100 | | USA, WTJC Newport NC | 9370na | | |
| 0000 | 0100 | | USA, WWCR Nashville TN | 5070na | 7465na | |
| | | | 5935na | 9980na | | |
| 0000 | 0100 | | USA, WWRB Manchester TN | 3185va | 3215na | |
| | | | 5050na | 6890na | | |
| 0000 | 0100 | | USA, WYFR/Family Radio Worldwide | | 5950na | |
| | | | 6985na | 9505sa | 15440am | |
| 0000 | 0100 | vl | Zambia CVC/ The Voice Africa | | 4965af | |
| 0005 | 0100 | twhfa | Canada, R Canada International | | 6100am | |
| 0025 | 0100 | | Sri Lanka, SLBC | 6005as | 9770as | 15745as |
| 0030 | 0045 | twhfas | Albania, Radio Tirana | 9345na | | |
| 0030 | 0045 | Sun | Germany, Pan American BC | 9640as | | |
| 0030 | 0058 | mtwhfa | Serbia, International Radio of Serbia | | 9675na | |
| 0030 | 0100 | | Australia, Radio Australia | 15415as | | |
| 0030 | 0100 | | China, China Radio International | | 11730as | |
| 0030 | 0100 | asf | UK, Bible Voice Broadcasting | 9490as | | |
| 0030 | 0100 | | USA, Voice of America | 7430va | 9715va | |
| | | | 9780va | 11725va | 15205va | 15290va |
| | | | 15560va | 17820va | | |
| 0030 | 0100 | | Uzbekistan, CVC Intl-The Voice Asia | | 11800as | |

## 0100 UTC - 9PM EDT / 8PM CDT / 6PM PDT

| | | | | | | |
|---|---|---|---|---|---|---|
| 0100 | 0105 | twhfa | Canada, R Canada International | | 6100am | |
| 0100 | 0125 | | Vietnam, Voice of Vietnam | 6175na | | |
| 0100 | 0127 | | Czech Rep, Radio Prague | 6200na | 7345na | |
| 0100 | 0127 | | Slovakia, R Slovakia International | | 5930am | |
| | | | 9440am | | | |
| 0100 | 0128 | | Serbia, International Radio of Serbia | | 9675na | |
| 0100 | 0130 | | Australia, Radio Australia | 9660as | 12080as | |
| | | | 13690as | 15240pa | 17715as | 17750va |
| | | | 17775va | 17795va | | |
| 0100 | 0157 | | North Korea, Voice of Korea | 7140as | 9345as | |
| | | | 9730as | 11735sa | 13760sa | 15180sa |
| 0100 | 0159 | | Canada, R Canada International | | 9620va | |
| 0100 | 0200 | | Anguilla, Worldwide Univ Network | | 6090am | |
| 0100 | 0200 | | Australia, ABC NT Katherine | 5025do | | |
| 0100 | 0200 | | Australia, ABC NT Tennant Creek | | 4910do | |
| 0100 | 0200 | | Canada, CFRX Toronto ON | 6070na | | |
| 0100 | 0200 | | Canada, CFVP Calgary AB | 6030na | | |
| 0100 | 0200 | | Canada, CKZN St John's NF | 6160na | | |
| 0100 | 0200 | | Canada, CKZU Vancouver BC | 6160na | | |
| 0100 | 0200 | | China, China Radio International | | 6080na | |
| | | | 6175as | 9410eu | 9470eu | 9535as |
| | | | 9580na | 9790na | 11870as | 15125as |
| | | | 15785as | | | |
| 0100 | 0200 | | Cuba, Radio Havana Cuba | 6000na | 6140na | |
| 0100 | 0200 | | Guyana, Voice of Guyana | 3291do | | |
| 0100 | 0200 | | Malaysia, RTM/Traxx FM | 7295as | | |
| 0100 | 0200 | DRM | New Zealand, Radio NZ International | | 13730pa | |
| 0100 | 0200 | | New Zealand, Radio NZ International | | 15720pa | |
| 0100 | 0200 | | Palau, T8WH/World Harvest | 15710as | | |
| 0100 | 0200 | vl | Papua New Guinea, Wantok R. Light | | 7325do | |
| 0100 | 0200 | | Russia, Voice of Russia | 9480sa | 9665sa | |
| 0100 | 0200 | | Sri Lanka, SLBC | 6005as | 9770as | 15745as |
| 0100 | 0200 | | UK, BBC World Service | 7395as | 9410as | |
| | | | 9740as | 11750as | 11955as | 15310as |
| | | | 15335as | 15360as | 17615as | |
| 0100 | 0200 | | USA, American Forces Network | | 4319usb | |
| | | | 5446usb | 5765usb | 6350usb | 7811usb |
| | | | 10320usb | 12133usb | 13362usb | |
| 0100 | 0200 | | USA, EWTN Vandiver AL | 11520af | | |
| 0100 | 0200 | | USA, KJES Vado NM | 7555na | | |
| 0100 | 0200 | | USA, Voice of America | 7430va | 9780va | |
| | | | 11705va | | | |
| 0100 | 0200 | | USA, WBCQ Monticello ME | 5110am | 7415am | |
| | | | 9330am | | | |
| 0100 | 0200 | | USA, WBOH Newport NC | 5920am | | |
| 0100 | 0200 | | USA, WHRA Greenbush ME | 5850eu | | |
| 0100 | 0200 | | USA, WHRI Cypress Creek SC | | 5875na | |
| | | | 7385na | | | |
| 0100 | 0200 | Sat/Sun | USA, WHRI Cypress Creek SC | | 7315va | |
| 0100 | 0200 | mtwhf | USA, WHRI Cypress Creek SC | | 5850na | |
| 0100 | 0200 | | USA, WINB Red Lion PA | 9265ca | | |
| 0100 | 0200 | | USA, WRMI Miami FL | 9955am | | |
| 0100 | 0200 | | USA, WTJC Newport NC | 9370na | | |
| 0100 | 0200 | | USA, WWCR Nashville TN | 3215na | 5070na | |
| | | | 5935na | 9980na | | |
| 0100 | 0200 | | USA, WWRB Manchester TN | 3185va | 5050na | |
| | | | 6890na | | | |
| 0100 | 0200 | | USA, WYFR/Family Radio Worldwide | | 5950na | |
| | | | 6985na | 9505na | 15440am | |
| 0100 | 0200 | | Uzbekistan, CVC Intl-The Voice Asia | | 11790as | |
| | | | 11880as | | | |
| 0100 | 0200 | vl | Zambia CVC/ The Voice Africa | | 4965af | |
| 0130 | 0200 | | Australia, Radio Australia | 9660as | 12080as | |
| | | | 13690as | 15240pa | 15415as | 17715as |
| | | | 17750va | 17795va | | |
| 0130 | 0200 | | Iran, VOIRI/ IRIB | 7235na | 9495na | |
| 0130 | 0200 | | Sweden, Radio Sweden | 6010na | | |
| 0130 | 0200 | twhfa | USA, Voice of America | 6040va | 9820va | |
| 0140 | 0200 | | Vatican City, Vatican Radio | 5915as | 7335as | |
| 0145 | 0200 | twhfas | Albania, Radio Tirana | 7425na | | |

## 0200 UTC - 10PM EDT / 9PM CDT / 7PM PDT

| | | | | | | |
|---|---|---|---|---|---|---|
| 0200 | 0227 | | Iran, VOIRI/ IRIB | 7235na | 9495na | |
| 0200 | 0230 | | Thailand, Radio Thailand World Svc | | 15275na | |
| 0200 | 0230 | | USA, KJES Vado NM | 7555na | | |
| 0200 | 0245 | | USA, WYFR/Family Radio Worldwide | | 11835am | |
| 0200 | 0257 | | North Korea, Voice of Korea | 13650as | 15100as | |
| 0200 | 0258 | Sun | Lithuania, Mighty KBC Radio | 6110na | | |
| 0200 | 0300 | | Anguilla, Worldwide Univ Network | | 6090am | |
| 0200 | 0300 | | Argentina, Radio Nacional RAE | | 11710am | |
| 0200 | 0300 | | Australia, ABC NT Alice Springs | | 2310do | |
| | | | 4835do | | | |
| 0200 | 0300 | | Australia, ABC NT Katherine | 5025do | | |
| 0200 | 0300 | | Australia, ABC NT Tennant Creek | | 4910do | |
| 0200 | 0300 | | Australia, Radio Australia | 9660as | 12080as | |
| | | | 13690as | 15240pa | 15415as | 15515as |
| | | | 17750va | 21725va | | |
| 0200 | 0300 | DRM | Bulgaria, Radio Bulgaria | 9500na | | |
| 0200 | 0300 | | Bulgaria, Radio Bulgaria | 9700na | 11700na | |
| 0200 | 0300 | | Canada, CFRX Toronto ON | 6070na | | |
| 0200 | 0300 | | Canada, CFVP Calgary AB | 6030na | | |
| 0200 | 0300 | | Canada, CKZN St John's NF | 6160na | | |
| 0200 | 0300 | | Canada, CKZU Vancouver BC | 6160na | | |
| 0200 | 0300 | | China, China Radio International | | 11770as | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | 13640as | | | |
| 0200 | 0300 | | Cuba, Radio Havana Cuba | 6000na | 6140na | |
| 0200 | 0300 | | Egypt, Radio Cairo | 7540na | | |
| 0200 | 0300 | | Guyana, Voice of Guyana | 3291do | | |
| 0200 | 0300 | | Indonesia, Voice of Indonesia | 9526va | 11784al | |
| 0200 | 0300 | | Malaysia, RTM/Traxx FM | 7295as | | |
| 0200 | 0300 | DRM | New Zealand, Radio NZ International | | 13730pa | |
| 0200 | 0300 | | New Zealand, Radio NZ International | | 15720pa | |
| 0200 | 0300 | | Palau, T8WH/World Harvest | 15710as | | |
| 0200 | 0300 | vl | Papua New Guinea, Wantok R. Light | | 7325do | |
| 0200 | 0300 | | Philippines, Radyo Pilipinas | 11880va | 15285va | |
| | | | 15510va | | | |
| 0200 | 0300 | | Russia, Voice of Russia | 9480sa | 9665sa | |
| | | | 15425na | | | |
| 0200 | 0300 | | South Korea, KBS World Radio | | 9580sa | |
| 0200 | 0300 | | Sri Lanka, SLBC 6005as | 9770as | 15745as | |
| 0200 | 0300 | | Taiwan, R Taiwan International | | 5950na | |
| 0200 | 0300 | vl | Uganda, UBC Radio | 4976do | | |
| 0200 | 0300 | | UK, BBC World Service | 6005af | 6195me | |
| | | | 9410eu 11955as | 15310as | | |
| 0200 | 0300 | | USA, American Forces Network | | 4319usb | |
| | | | 5446usb 5765usb | 6350usb | 7811usb | |
| | | | 10320usb 12133usb | 13362usb | | |
| 0200 | 0300 | | USA, EWTN Vandiver AL | 11520af | | |
| 0200 | 0300 | | USA, WBCQ Monticello ME | 5110am | 7415am | |
| | | | 9330am | | | |
| 0200 | 0300 | | USA, WBOH Newport NC | 5920am | | |
| 0200 | 0300 | | USA, WHRA Greenbush ME | 5850eu | | |
| 0200 | 0300 | | USA, WHRI Cypress Creek SC | | 5875na | |
| | | | 7315va 7385na | | | |
| 0200 | 0300 | | USA, WINB Red Lion PA | 9265ca | | |
| 0200 | 0300 | | USA, WRMI Miami FL | 9955am | | |
| 0200 | 0300 | | USA, WTJC Newport NC | 9370na | | |
| 0200 | 0300 | | USA, WWCR Nashville TN | 3215na | 5070na | |
| | | | 5890na 5935na | | | |
| 0200 | 0300 | | USA, WWRB Manchester TN | 3185va | 5050na | |
| | | | 6890na | | | |
| 0200 | 0300 | | USA, WYFR/Family Radio Worldwide | | 5985sa | |
| | | | 6985na 9505na | 9680am | 11855sa | |
| 0200 | 0300 | | Uzbekistan, CVC Intl-The Voice Asia | | 11790as | |
| | | | 11880as | | | |
| 0200 | 0300 | vl | Vatican City, Vatican Radio | 9310va | 12070va | |
| 0200 | 0300 | vl | Zambia CVC/ The Voice Africa | | 4965af | |
| 0215 | 0230 | | Nepal, Radio Nepal | 5005as | | |
| 0230 | 0255 | | Vietnam, Voice of Vietnam | 6175na | | |
| 0230 | 0300 | twhfas | Albania, Radio Tirana | 7425na | | |
| 0230 | 0300 | | China, China Radio International | | 15435as | |
| 0230 | 0300 | | Malaysia, RTM/Voice of Malaysia | | 15295pa | |
| 0230 | 0300 | | Sweden, Radio Sweden | 6010na | 11550va | |
| 0245 | 0300 | | Australia, HCJB Global | 15400as | | |
| 0250 | 0300 | | Vatican City, Vatican Radio | 6040na | 7305na | |
| 0255 | 0300 | vl | Rwanda, Radio Rwanda | 6055do | | |

## 0300 UTC - 11PM EDT / 10PM CDT / 8PM PDT

| | | | | | | |
|---|---|---|---|---|---|---|
| 0300 | 0320 | | Vatican City, Vatican Radio | 6040am | 7305na | |
| | | | 9545as | | | |
| 0300 | 0327 | | Czech Rep, Radio Prague | 7345na | 9870na | |
| 0300 | 0330 | | Egypt, Radio Cairo | 7540na | | |
| 0300 | 0330 | | Philippines, Radyo Pilipinas | 11880va | 15285va | |
| | | | 15510va | | | |
| 0300 | 0330 | | Uzbekistan, CVC Intl-The Voice Asia | | 11800as | |
| | | | 11880as | | | |
| 0300 | 0330 | vl | Vatican City, Vatican Radio | 7360af | 9310va | |
| | | | 9660af 12070va | | | |
| 0300 | 0355 | | Turkey, Voice of Turkey | 5975va | 6165me | |
| | | | 7325na | | | |
| 0300 | 0356 | | Romania, R Romania International | | 6150na | |
| | | | 9645na 9735as | 11895as | | |
| 0300 | 0357 | | North Korea, Voice of Korea | 7140as | 9345as | |
| | | | 9730as | | | |
| 0300 | 0400 | | Anguilla, Worldwide Univ Network | | 6090am | |
| 0300 | 0400 | | Australia, ABC NT Alice Springs | | 2310do | |
| | | | 4835do | | | |
| 0300 | 0400 | | Australia, ABC NT Katherine | 5025do | | |
| 0300 | 0400 | | Australia, ABC NT Tennant Creek | | 4910do | |
| 0300 | 0400 | | Australia, Radio Australia | 9660as | 12080as | |
| | | | 13690as 15240pa | 15415as | 15515as | |
| | | | 17750va 21725va | | | |
| 0300 | 0400 | twhfas | Canada, CBC NQ SW Service | 9625na | | |
| 0300 | 0400 | | Canada, CFRX Toronto ON | 6070na | | |
| 0300 | 0400 | | Canada, CFVP Calgary AB | 6030na | | |
| 0300 | 0400 | | Canada, CKZN St John's NF | 6160na | | |
| 0300 | 0400 | | Canada, CKZU Vancouver BC | 6160na | | |
| 0300 | 0400 | | China, China Radio International | | 9690na | |
| | | | 9790na 11770as | 13750as | 15110as | |
| | | | 15120as 15785as | | | |
| 0300 | 0400 | | Cuba, Radio Havana Cuba | 6000na | 6140na | |
| 0300 | 0400 | | Germany, Deutsche Welle | 11975as | 15595as | |
| 0300 | 0400 | | Guyana, Voice of Guyana | 3291do | | |
| 0300 | 0400 | | Malaysia, RTM/Traxx FM | 7295as | | |
| 0300 | 0400 | | Malaysia, RTM/Voice of Malaysia | | 6175as | |
| | | | 9750as 15295as | | | |
| 0300 | 0400 | | New Zealand, Radio NZ International | | 15720pa | |
| 0300 | 0400 | DRM | New Zealand, Radio NZ International | | 13730pa | |
| 0300 | 0400 | | Oman, Radio Oman | 15355as | | |
| 0300 | 0400 | | Palau, T8WH/World Harvest | 15700as | | |
| 0300 | 0400 | vl | Papua New Guinea, Wantok R. Light | | 7325do | |
| 0300 | 0400 | DRM | Russia, Voice of Russia | 15735as | | |
| 0300 | 0400 | | Russia, Voice of Russia | 9665sa | 15425na | |
| | | | 15585as 15755as | | | |
| 0300 | 0400 | vl | Rwanda, Radio Rwanda | 6055do | | |
| 0300 | 0400 | | South Africa, Channel Africa | 3345af | 6135af | |
| 0300 | 0400 | | Sri Lanka, SLBC 6005as | 9770as | 15745as | |
| 0300 | 0400 | | Sweden, Radio Sweden | 6010na | | |
| 0300 | 0400 | | Taiwan, R Taiwan International | | 5950na | |
| 0300 | 0400 | | UK, BBC World Service | 3255af | 6005af | |
| | | | 6145af 6190af | 6195as | 7255af | |
| | | | 9410eu 9750af | 12035af | 12095as | |
| | | | 15310as 17790as | | | |
| 0300 | 0400 | | Ukraine, R Ukraine International | | 7440na | |
| 0300 | 0400 | | USA, American Forces Network | | 4319usb | |
| | | | 5446usb 5765usb | 6350usb | 7811usb | |
| | | | 10320usb 12133usb | 13362usb | | |
| 0300 | 0400 | | USA, EWTN Vandiver AL | 11520af | | |
| 0300 | 0400 | | USA, Voice of America | 4930af | 6080af | |
| | | | 9885af 15580af | | | |
| 0300 | 0400 | | USA, WBCQ Monticello ME | 5110am | 7415am | |
| | | | 9330am | | | |
| 0300 | 0400 | | USA, WBOH Newport NC | 5920am | | |
| 0300 | 0400 | | USA, WHRA Greenbush ME | 5850eu | | |
| 0300 | 0400 | twhfa | USA, WHRI Cypress Creek SC | | 6110ca | |
| 0300 | 0400 | | USA, WHRI Cypress Creek SC | | 5875na | |
| | | | 7315va | | | |
| 0300 | 0400 | | USA, WRMI Miami FL | 9955am | | |
| 0300 | 0400 | | USA, WTJC Newport NC | 9370na | | |
| 0300 | 0400 | | USA, WWCR Nashville TN | 3215na | 5070na | |
| | | | 5890na 5935na | | | |
| 0300 | 0400 | | USA, WWRB Manchester TN | 3185va | 5050na | |
| | | | 6890na | | | |
| 0300 | 0400 | | USA, WYFR/Family Radio Worldwide | | 11740na | |
| | | | 15255am | | | |
| 0300 | 0400 | | Uzbekistan, CVC Intl-The Voice Asia | | 13680as | |
| 0300 | 0400 | vl | Zambia CVC/ The Voice Africa | | 4965af | |
| 0330 | 0355 | | Vietnam, Voice of Vietnam | 6175na | | |
| 0330 | 0357 | | Czech Rep, Radio Prague | 6080na | 9445na | |
| | | | 11600na | | | |
| 0330 | 0400 | twhfas | Albania, Radio Tirana | 7425na | | |
| 0330 | 0400 | | UK, BBC World Service | 11945af | | |
| 0330 | 0400 | | Uzbekistan, CVC Intl-The Voice Asia | | 15555as | |

## 0400 UTC - 12AM EDT / 11PM CDT / 9PM PDT

| | | | | | | |
|---|---|---|---|---|---|---|
| 0400 | 0430 | | Australia, Radio Australia | 9660as | 12080as | |
| | | | 13690as 15240pa | 15515as | 17750va | |
| | | | 21725va | | | |
| 0400 | 0430 | mtwhf | France, Radio France International | | 9805af | |
| | | | 11995af | | | |
| 0400 | 0430 | | Netherlands, R Netherlands Worldwide | | 9885af | |
| | | | 12080af | | | |
| 0400 | 0430 | | USA, Voice of America | 4930af | 6080af | |
| | | | 9885af 15580af | | | |
| 0400 | 0445 | | USA, WYFR/Family Radio Worldwide | | 6985na | |
| | | | 9505na | | | |
| 0400 | 0458 | | New Zealand, Radio NZ International | | 15720pa | |
| 0400 | 0458 | DRM | New Zealand, Radio NZ International | | 13730pa | |
| 0400 | 0500 | | Anguilla, Worldwide Univ Network | | 6090am | |
| 0400 | 0500 | | Australia, ABC NT Alice Springs | | 2310do | |
| | | | 4835do | | | |
| 0400 | 0500 | | Australia, ABC NT Katherine | 5025do | | |
| 0400 | 0500 | | Australia, ABC NT Tennant Creek | | 4910do | |
| 0400 | 0500 | twhfas | Canada, CBC NQ SW Service | 9625na | | |
| 0400 | 0500 | | Canada, CFRX Toronto ON | 6070na | | |
| 0400 | 0500 | | Canada, CKZN St John's NF | 6160na | | |
| 0400 | 0500 | | Canada, CKZU Vancouver BC | 6160na | | |
| 0400 | 0500 | | China, China Radio International | | 6020na | |
| | | | 6080na 6190na | 13750as | 15120as | |
| | | | 15785as 17730as | 17855as | | |
| 0400 | 0500 | | Cuba, Radio Havana Cuba | 6000na | 6140na | |
| 0400 | 0500 | | Germany, Deutsche Welle | 7245af | 7430af | |
| | | | 12045af 15445af | | | |
| 0400 | 0500 | DRM | Germany, Deutsche Welle | 3995af | | |
| 0400 | 0500 | | Guyana, Voice of Guyana | 3291do | | |
| 0400 | 0500 | | Malaysia, RTM/Traxx FM | 7295as | | |
| 0400 | 0500 | | Malaysia, RTM/Voice of Malaysia | | 6175as | |
| | | | 9750as 15295as | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 0400 | 0500 | | Palau, T8WH/World Harvest | 15700as | | |
| 0400 | 0500 | vl | Papua New Guinea, Wantok R. Light | 7325do | | |
| 0400 | 0500 | | Russia, Voice of Russia | 13755na | 15585as | 15755as |
| 0400 | 0500 | DRM | Russia, Voice of Russia | 15735as | | |
| 0400 | 0500 | vl | Rwanda, Radio Rwanda | 6055do | | |
| 0400 | 0500 | | South Africa, Channel Africa | 3345af | | |
| 0400 | 0500 | | Sri Lanka, SLBC 6005as | 9770as | 15745as | |
| 0400 | 0500 | vl | Uganda, UBC Radio | 4976do | | |
| 0400 | 0500 | DRM | UK, BBC World Service | 3995eu | | |
| 0400 | 0500 | | UK, BBC World Service | 3255af | 6005af | 6190af |
| | | | 7255af | 7310af | 9410eu | 11945af |
| | | | 12035af | 12095as | 13675eu | 15310as |
| | | | 15360as | 17790as | | |
| 0400 | 0500 | | USA, American Forces Network | 4319usb | | |
| | | | 5446usb | 5765usb | 6350usb | 7811usb |
| | | | 10320usb | 12133usb | 13362usb | |
| 0400 | 0500 | | USA, EWTN Vandiver AL | 11520af | | |
| 0400 | 0500 | | USA, WBCQ Monticello ME | 5110am | 7415am | 9330am |
| 0400 | 0500 | | USA, WBOH Newport NC | 5920am | | |
| 0400 | 0500 | | USA, WHRA Greenbush ME | 5850eu | | |
| 0400 | 0500 | | USA, WHRI Cypress Creek SC | 5875na | 7315va | |
| 0400 | 0500 | Sat/Sun | USA, WHRI Cypress Creek SC | 9825na | | |
| 0400 | 0500 | mtwhf | USA, WHRI Cypress Creek SC | 5850na | | |
| 0400 | 0500 | | USA, WRMI Miami FL | 9955am | | |
| 0400 | 0500 | | USA, WTJC Newport NC | 9370na | | |
| 0400 | 0500 | | USA, WWCR Nashville TN | 3215na | 5070na | 5890na |
| | | | 5935na | | | |
| 0400 | 0500 | | USA, WWRB Manchester TN | 3185va | | |
| 0400 | 0500 | | USA, WYFR/Family Radio Worldwide | 5950na | 6915na | 9680na |
| 0400 | 0500 | | Uzbekistan, CVC Intl-The Voice Asia | 13680as | 15555as | |
| 0400 | 0500 | vl | Zambia CVC/ The Voice Africa | 4965af | 9430af | |
| 0430 | 0500 | | Australia, Radio Australia | 9660as | 12080as | 13690as |
| | | | 15240pa | 15415as | 15515as | 17750va |
| | | | 21725va | | | |
| 0430 | 0500 | mtwh | Italy, NEXUS/IRRS 5990va | | | |
| 0430 | 0500 | | Netherlands, R Netherlands Worldwide | 12080af | | |
| 0430 | 0500 | | Nigeria, Radio Nigeria/Kaduna | 6090do | | |
| 0430 | 0500 | | USA, Voice of America | 4930af | 4960af | 6080af |
| | | | 9885af | 15580af | | |
| 0450 | 0500 | | Swaziland, TWR 3200af | | | |
| 0459 | 0500 | | New Zealand, Radio NZ International | 11725pa | | |
| 0459 | 0500 | DRM | New Zealand, Radio NZ International | 11675pa | | |

## 0500 UTC - 1AM EDT / 12AM CDT / 10PM PDT

| | | | | | | |
|---|---|---|---|---|---|---|
| 0500 | 0507 | twhfas | Canada, CBC NQ SW Service | 9625na | | |
| 0500 | 0525 | | Swaziland, TWR 3200af | | | |
| 0500 | 0530 | | Australia, Radio Australia | 9660as | 12080as | 13690as |
| | | | 15160as | 15240pa | 15515as | 17750va |
| 0500 | 0530 | mtwhf | France, Radio France International | 11995af | 13680af | 15160af |
| 0500 | 0530 | | Germany, Deutsche Welle | 9440af | 9770af | 9825af |
| 0500 | 0530 | mtwh | Italy, NEXUS/IRRS 5990va | | | |
| 0500 | 0530 | | Japan, NHK World Radio Japan | 5975eu | 6110na | 11970af |
| | | | 15325as | 17810as | | |
| 0500 | 0530 | | Vatican City, Vatican Radio | 4005eu | 5965eu | 7250eu |
| | | | 9660af | 11625af | 13765af | |
| 0500 | 0600 | | Anguilla, Worldwide Univ Network | 6090am | | |
| 0500 | 0600 | | Australia, ABC NT Alice Springs | 2310do | 4835do | |
| 0500 | 0600 | | Australia, ABC NT Katherine 5025do | | | |
| 0500 | 0600 | | Australia, ABC NT Tennant Creek | 4910do | | |
| 0500 | 0600 | | Bhutan, Bhutan Broadcasting Svc | 6035as | | |
| 0500 | 0600 | | Canada, CFRX Toronto ON | 6070na | | |
| 0500 | 0600 | | Canada, CKZN St John's NF | 6160na | | |
| 0500 | 0600 | | Canada, CKZU Vancouver BC | 6160na | | |
| 0500 | 0600 | | China, China Radio International | 6020na | 11710af | 11880as |
| | | | 11895as | 15350as | 15465as | 17505va |
| | | | 17540as | 17730as | 17855as | |
| 0500 | 0600 | | Cuba, Radio Havana Cuba | 6000na | 6010na | 6140na |
| | | | 11760na | | | |
| 0500 | 0600 | DRM | Germany, Deutsche Welle | 17525as | | |
| 0500 | 0600 | | Guyana, Voice of Guyana | 3291do | | |
| 0500 | 0600 | | Kuwait, Radio Kuwait | 15110va | | |
| 0500 | 0600 | | Malaysia, RTM/Traxx FM | 7295as | | |
| 0500 | 0600 | | Malaysia, RTM/Voice of Malaysia | 6175as | 9750as | 15295as |
| 0500 | 0600 | | New Zealand, Radio NZ International | 11725pa | | |
| 0500 | 0600 | DRM | New Zealand, Radio NZ International | 11675pa | | |
| 0500 | 0600 | | Nigeria, Radio Nigeria/Kaduna | 4770do | | |
| 0500 | 0600 | | Palau, T8WH/World Harvest | 15700as | | |
| 0500 | 0600 | vl | Papua New Guinea, Wantok R. Light | 7325do | | |
| 0500 | 0600 | | Russia, Voice of Russia | 13755na | | |
| 0500 | 0600 | | South Africa, Channel Africa | 7230af | | |
| 0500 | 0600 | vl | Uganda, UBC Radio | 4976do | | |
| 0500 | 0600 | | UK, BBC World Service | 3255af | 3995eu | 6005af |
| | | | 6190af | 7255af | 7310af | 9410eu |
| | | | 11945af | 12095as | 15310as | 15360as |
| | | | 15420af | 15565eu | 17640af | 17790as |
| 0500 | 0600 | DRM | UK, BBC World Service | 3995af | | |
| 0500 | 0600 | | Ukraine, R Ukraine International | 9945eu | | |
| 0500 | 0600 | | USA, American Forces Network | 4319usb | | |
| | | | 5446usb | 5765usb | 6350usb | 7811usb |
| | | | 10320usb | 12133usb | 13362usb | |
| 0500 | 0600 | | USA, EWTN Vandiver AL | 11520af | | |
| 0500 | 0600 | | USA, Voice of America | 4930af | 6080af | 12080af |
| | | | 15580af | | | |
| 0500 | 0600 | | USA, WBCQ Monticello ME | 5110am | 7415am | 9330am |
| 0500 | 0600 | | USA, WBOH Newport NC | 5920am | | |
| 0500 | 0600 | | USA, WHRA Greenbush ME | 7390va | | |
| 0500 | 0600 | | USA, WHRI Cypress Creek SC | 5875na | 7390na | 11565na |
| 0500 | 0600 | | USA, WRMI Miami FL | 9955am | | |
| 0500 | 0600 | | USA, WTJC Newport NC | 9370na | | |
| 0500 | 0600 | | USA, WWCR Nashville TN | 3215na | 5070na | 5890na |
| | | | 5935na | | | |
| 0500 | 0600 | | USA, WWRB Manchester TN | 3185va | | |
| 0500 | 0600 | | USA, WYFR/Family Radio Worldwide | 5950na | 6915na | 9680na |
| 0500 | 0600 | | Uzbekistan, CVC Intl-The Voice Asia | 13680as | 15555as | |
| 0500 | 0600 | vl | Zambia CVC/ The Voice Africa | 4965af | 9430af | |
| 0515 | 0530 | vl | Rwanda, Radio Rwanda | 6055do | | |
| 0530 | 0556 | | Romania, R Romania International | 7305eu | 9655eu | 15435pa |
| | | | 17760pa | | | |
| 0530 | 0600 | | Australia, Radio Australia | 9660as | 12080as | 13690as |
| | | | 15160as | 15240pa | 15415as | 15515as |
| | | | 17750va | | | |
| 0530 | 0600 | | China, Central People's BS/CNR | 9530do | 11685do | 15570do |
| 0530 | 0600 | vl | Rwanda, Radio Rwanda | 6055do | | |
| 0530 | 0600 | | Thailand, Radio Thailand World Svc | 17655va | | |

## 0600 UTC - 2AM EDT / 1AM CDT / 11PM PDT

| | | | | | | |
|---|---|---|---|---|---|---|
| 0600 | 0603 | | Croatia, Voice of Croatia | 7355eu | | |
| 0600 | 0615 | Sat/Sun | South Africa, Trans World Radio | 11640af | | |
| 0600 | 0630 | Sat/Sun | Australia, Radio Australia | 15180as | 15290as | |
| 0600 | 0630 | | Australia, Radio Australia | 9660as | 11650as | 12080as |
| | | | 13690as | 15160as | 15240pa | 15515as |
| | | | 17750va | | | |
| 0600 | 0630 | mtwhf | France, Radio France International | 9765af | 11610af | 15160af |
| | | | 17800af | | | |
| 0600 | 0630 | | Germany, Deutsche Welle | 7310af | 15275af | |
| 0600 | 0630 | | Nigeria, Radio, National Svc/Abuja | 7275do | | |
| 0600 | 0645 | mtwhf | South Africa, Trans World Radio | 11640af | | |
| 0600 | 0645 | | Swaziland, TWR 11640af | | | |
| 0600 | 0658 | | New Zealand, Radio NZ International | 11725pa | | |
| 0600 | 0658 | DRM | New Zealand, Radio NZ International | 11675pa | | |
| 0600 | 0700 | | Anguilla, Worldwide Univ Network | 6090am | | |
| 0600 | 0700 | | Australia, ABC NT Alice Springs | 2310do | 4835do | |
| 0600 | 0700 | | Australia, ABC NT Katherine 5025do | | | |
| 0600 | 0700 | | Australia, ABC NT Tennant Creek | 4910do | | |
| 0600 | 0700 | | Canada, CFRX Toronto ON | 6070na | | |
| 0600 | 0700 | | Canada, CFVP Calgary AB | 6030na | | |
| 0600 | 0700 | | Canada, CKZN St John's NF | 6160na | | |
| 0600 | 0700 | | Canada, CKZU Vancouver BC | 6160na | | |
| 0600 | 0700 | | China, China Radio International | 11710af | 11870as | 11880as |
| | | | 11895as | 13660as | 15140as | 15350as |
| | | | 15465as | 17505va | 17540as | 17710as |
| 0600 | 0700 | | Cuba, Radio Havana Cuba | 6000na | 6010na | 6140na |
| | | | 11760na | | | |
| 0600 | 0700 | | Germany, Deutsche Welle | 3995eu | 6130eu | |
| 0600 | 0700 | DRM | Germany, Deutsche Welle | 3995eu | 6130eu | |
| 0600 | 0700 | | Greece, Voice of Greece | 11645eu | | |
| 0600 | 0700 | | Guyana, Voice of Guyana | 3291do | | |
| 0600 | 0700 | | Kuwait, Radio Kuwait | 15110va | | |
| 0600 | 0700 | vl | Liberia, ELWA 4760do | 6070al | | |
| 0600 | 0700 | | Malaysia, RTM/Traxx FM | 7295as | | |
| 0600 | 0700 | | Malaysia, RTM/Voice of Malaysia | 6175as | 9750as | 15295as |
| 0600 | 0700 | | Nigeria, Radio Nigeria/Kaduna | 4770do | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 0600 | 0700 | | Palau, T8WH/World Harvest | 15700as | | |
| 0600 | 0700 | vl | Papua New Guinea, Wantok R. Light | 7325do | | |
| 0600 | 0700 | | Russia, Voice of Russia | 17635pa | | |
| 0600 | 0700 | | South Africa, Channel Africa | 7230af | 15255af | |
| 0600 | 0700 | | UK, BBC World Service | 3995eu | 6005af | |
| | | | 6190af | 9410af | 9860af | 11765af |
| | | | 12015af | 12095as | 15310as | 17640af |
| | | | 17790as | | | |
| 0600 | 0700 | Sat/Sun | UK, BBC World Service | 15420af | | |
| 0600 | 0700 | | USA, American Forces Network | | | 4319usb |
| | | | 5446usb | 5765usb | 6350usb | 7811usb |
| | | | 10320usb | 12133usb | 13362usb | |
| 0600 | 0700 | | USA, EWTN Vandiver AL | 11520af | | |
| 0600 | 0700 | | USA, Voice of America | 6080af | 12080af | |
| | | | 15580af | | | |
| 0600 | 0700 | | USA, WBCQ Monticello ME | 5110am | 7415am | |
| 0600 | 0700 | | USA, WBOH Newport NC | 5920am | | |
| 0600 | 0700 | | USA, WHRA Greenbush ME | 7390va | | |
| 0600 | 0700 | | USA, WHRI Cypress Creek SC | | | 5875na |
| | | | 11565na | | | |
| 0600 | 0700 | Sat | USA, WHRI Cypress Creek SC | | | 7390na |
| 0600 | 0700 | smtwhf | USA, WHRI Cypress Creek SC | | | 7365na |
| 0600 | 0700 | | USA, WRMI Miami FL | 9955am | | |
| 0600 | 0700 | | USA, WTJC Newport NC | 9370na | | |
| 0600 | 0700 | | USA, WWCR Nashville TN | 3215na | 5070na | |
| | | | 5890na | 5935na | | |
| 0600 | 0700 | | USA, WWRB Manchester TN | 3185va | | |
| 0600 | 0700 | | USA, WYFR/Family Radio Worldwide | | | 5850eu |
| | | | 7520sa | 9680na | 11530va | 11580va |
| 0600 | 0700 | | Uzbekistan, CVC Intl-The Voice Asia | | | 15555as |
| | | | 15555as | | | |
| 0600 | 0700 | vl | Vanuatu, Radio Vanuatu | 7260do | | |
| 0600 | 0700 | vl | Zambia CVC/ The Voice Africa | | | 6065af |
| | | | 13590af | | | |
| 0630 | 0645 | | Vatican City, Vatican Radio | 4005eu | 5965eu | |
| | | | 7250eu | 9645eu | 11740eu | 15595me |
| 0630 | 0700 | | Australia, Radio Australia | 9660as | 11650as | |
| | | | 12080as | 13690as | 15160as | 15240pa |
| | | | 15415as | 15515as | 17750va | |
| 0630 | 0700 | | Bulgaria, Radio Bulgaria | 9600eu | 11600eu | |
| 0630 | 0700 | | Swaziland, TWR 3200af | | | |
| 0645 | 0700 | Sun | Germany, TWR Europe | 6105eu | | |
| 0645 | 0700 | Sun | Monaco, TWR Europe | 9800eu | | |
| 0659 | 0700 | | New Zealand, Radio NZ International | | | 6170pa |
| 0659 | 0700 | DRM | New Zealand, Radio NZ International | | | 7285pa |

## 0700 UTC - 3AM EDT / 2AM CDT / 12AM PDT

| | | | | | | |
|---|---|---|---|---|---|---|
| 0700 | 0727 | | Czech Rep, Radio Prague | 9880eu | 11600na | |
| 0700 | 0727 | | Slovakia, R Slovakia International | | | 9440va |
| | | | 11650va | | | |
| 0700 | 0730 | | France, Radio France International | | | 13675af |
| 0700 | 0730 | Sun | UK, Bible Voice Broadcasting | 5945eu | | |
| 0700 | 0745 | | USA, WYFR/Family Radio Worldwide | | | 7520eu |
| 0700 | 0750 | smtwhf | Germany, TWR Europe | 6105eu | | |
| 0700 | 0750 | smtwhf | Monaco, TWR Europe | 9800eu | | |
| 0700 | 0800 | | Anguilla, Worldwide Univ Network | | | 6090am |
| 0700 | 0800 | | Australia, ABC NT Alice Springs | | | 2310do |
| | | | 4835do | | | |
| 0700 | 0800 | | Australia, ABC NT Katherine | 5025do | | |
| 0700 | 0800 | | Australia, ABC NT Tennant Creek | | | 4910do |
| 0700 | 0800 | | Australia, Radio Australia | 9475as | 9660as | |
| | | | 9710as | 11650as | 11945as | 12080as |
| | | | 13630pa | 15160va | 15240pa | 17750va |
| 0700 | 0800 | | Bhutan, Bhutan Broadcasting Svc | | | 6035as |
| 0700 | 0800 | | Canada, CFRX Toronto ON | 6070na | | |
| 0700 | 0800 | | Canada, CFVP Calgary AB | 6030na | | |
| 0700 | 0800 | | Canada, CKZN St John's NF | 6160na | | |
| 0700 | 0800 | | Canada, CKZU Vancouver BC | 6160na | | |
| 0700 | 0800 | | China, China Radio International | | | 11880as |
| | | | 11895as | 13660as | 13710eu | 15125as |
| | | | 15350as | 15465as | 17490eu | 17540as |
| | | | 17710as | | | |
| 0700 | 0800 | DRM | Germany, Deutsche Welle | 5790eu | 9545eu | |
| 0700 | 0800 | | Guyana, Voice of Guyana | 3291do | | |
| 0700 | 0800 | | Kuwait, Radio Kuwait | 15110va | | |
| 0700 | 0800 | Sat | Latvia, Radio SWH | 9290eu | | |
| 0700 | 0800 | vl | Liberia, ELWA | 4760do | 6070al | |
| 0700 | 0800 | | Malaysia, RTM/Traxx FM | 7295as | | |
| 0700 | 0800 | | Malaysia, RTM/Voice of Malaysia | | | 6175as |
| | | | 9750as | 15295as | | |
| 0700 | 0800 | | Myanmar, Myanma Radio | 9731do | | |
| 0700 | 0800 | | New Zealand, Radio NZ International | | | 6170pa |
| 0700 | 0800 | DRM | New Zealand, Radio NZ International | | | 7285pa |
| 0700 | 0800 | | Nigeria, Radio Nigeria/Kaduna | | | 4770do |
| 0700 | 0800 | | Palau, T8WH/World Harvest | 9930as | 15700as | |
| 0700 | 0800 | vl | Papua New Guinea, R East New Britain | | | 3385do |
| 0700 | 0800 | vl | Papua New Guinea, Wantok R. Light | | | 7325do |
| 0700 | 0800 | | Russia, Voice of Russia | 17635as | 21790as | |
| 0700 | 0800 | vl | Solomon Islands, SIBC | 5020do | | |
| 0700 | 0800 | | South Africa, Channel Africa | 7230af | | |
| 0700 | 0800 | | Swaziland, TWR 3200af | | | |
| 0700 | 0800 | Sat/Sun | UK, BBC World Service | 15420af | | |
| 0700 | 0800 | | UK, BBC World Service | 5790eu | 6190af | |
| | | | 9860af | 11760me | 11765af | 13820af |
| | | | 15310af | 15400af | 15575as | 17790as |
| | | | 17830af | | | |
| 0700 | 0800 | | USA, American Forces Network | | | 4319usb |
| | | | 5446usb | 5765usb | 6350usb | 7811usb |
| | | | 10320usb | 12133usb | 13362usb | |
| 0700 | 0800 | | USA, EWTN Vandiver AL | 11520af | | |
| 0700 | 0800 | | USA, WBCQ Monticello ME | 5110am | 7415am | |
| 0700 | 0800 | | USA, WBOH Newport NC | 5920am | | |
| 0700 | 0800 | | USA, WHRI Cypress Creek SC | | | 7385na |
| | | | 7390na | 11565na | | |
| 0700 | 0800 | | USA, WRMI Miami FL | 9955am | | |
| 0700 | 0800 | | USA, WTJC Newport NC | 9370na | | |
| 0700 | 0800 | | USA, WWCR Nashville TN | 3215na | 5070na | |
| | | | 5890na | 5935na | | |
| 0700 | 0800 | | USA, WWRB Manchester TN | 3185va | | |
| 0700 | 0800 | | USA, WYFR/Family Radio Worldwide | | | 5950na |
| | | | 5985na | 6915na | 9385am | 9505af |
| 0700 | 0800 | | Uzbekistan, CVC Intl-The Voice Asia | | | 15555as |
| | | | 15555as | | | |
| 0700 | 0800 | vl | Vanuatu, Radio Vanuatu | 7260do | | |
| 0700 | 0800 | vl | Zambia CVC/ The Voice Africa | | | 6065af |
| | | | 13590af | | | |
| 0715 | 0750 | Sat | Germany, TWR Europe | 6105eu | | |
| 0715 | 0750 | Sat | Monaco, TWR Europe | 9800eu | | |
| 0730 | 0800 | | Australia, HCJB Global | 11750pa | | |
| 0730 | 0800 | Sat | UK, Bible Voice Broadcasting | 5945eu | | |
| 0745 | 0800 | f | UK, Bible Voice Broadcasting | 5945eu | | |
| 0750 | 0800 | | Saudi Arabia, BSKSA | 17785as | | |

## 0800 UTC - 4AM EDT / 3AM CDT / 1AM PDT

| | | | | | | |
|---|---|---|---|---|---|---|
| 0800 | 0815 | Sat | UK, Bible Voice Broadcasting | 5945eu | | |
| 0800 | 0825 | | Malaysia, RTM/Voice of Malaysia | | | 6175as |
| | | | 9750as | 15295as | | |
| 0800 | 0830 | | Australia, ABC NT Katherine | 5025do | | |
| 0800 | 0830 | | Australia, ABC NT Tennant Creek | | | 4910do |
| 0800 | 0830 | | Myanmar, Myanma Radio | 9731do | | |
| 0800 | 0845 | | USA, WYFR/Family Radio Worldwide | | | 5950na |
| | | | 9385af | | | |
| 0800 | 0900 | | Anguilla, Worldwide Univ Network | | | 6090am |
| 0800 | 0900 | | Australia, ABC NT Alice Springs | | | 2310do |
| | | | 4835do | | | |
| 0800 | 0900 | | Australia, HCJB Global | 11750pa | | |
| 0800 | 0900 | | Australia, Radio Australia | 5995as | 9475as | |
| | | | 9580va | 9590as | 9710as | 11945pa |
| | | | 12080as | 13630pa | | |
| 0800 | 0900 | | Bhutan, Bhutan Broadcasting Svc | | | 6035as |
| 0800 | 0900 | | Canada, CFRX Toronto ON | 6070na | | |
| 0800 | 0900 | | Canada, CFVP Calgary AB | 6030na | | |
| 0800 | 0900 | | Canada, CKZN St John's NF | 6160na | | |
| 0800 | 0900 | | Canada, CKZU Vancouver BC | 6160na | | |
| 0800 | 0900 | | China, China Radio International | | | 11620as |
| | | | 11880as | 11895as | 13710eu | 15125af |
| | | | 15350as | 15465as | 15625as | 17490eu |
| | | | 17540as | | | |
| 0800 | 0900 | DRM | Germany, Deutsche Welle | 9545eu | 12095as | |
| | | | 13810eu | | | |
| 0800 | 0900 | | Guyana, Voice of Guyana | 3291do | | |
| 0800 | 0900 | Sat | Italy, NEXUS/IRRS | 9510va | | |
| 0800 | 0900 | vl | Liberia, ELWA | 4760do | 6070al | |
| 0800 | 0900 | | Malaysia, RTM/Traxx FM | 7295as | | |
| 0800 | 0900 | | New Zealand, Radio NZ International | | | 6170pa |
| 0800 | 0900 | DRM | New Zealand, Radio NZ International | | | 7285pa |
| 0800 | 0900 | | Nigeria, Radio Nigeria/Kaduna | | | 4770do |
| 0800 | 0900 | | Nigeria, Voice of Nigeria/Lagos | | | 9690af |
| 0800 | 0900 | | Palau, T8WH/World Harvest | 9930as | 15700as | |
| 0800 | 0900 | vl | Papua New Guinea, R East New Britain | | | 3385do |
| 0800 | 0900 | vl | Papua New Guinea, Wantok R. Light | | | 7325do |
| 0800 | 0900 | | Russia, Voice of Russia | 17635as | 21790as | |
| 0800 | 0900 | DRM | Russia, Voice of Russia | 12060eu | | |
| 0800 | 0900 | vl | Solomon Islands, SIBC | 5020do | | |
| 0800 | 0900 | | South Africa, Channel Africa | 9625af | | |
| 0800 | 0900 | Sun | South Africa, SA Radio League | | | 7205af |
| | | | 17570af | | | |
| 0800 | 0900 | | South Korea, KBS World Radio | | | 9570as |
| 0800 | 0900 | | Swaziland, TWR 6120af | | | |
| 0800 | 0900 | | UK, BBC World Service | 6190af | 9860af | |
| | | | 11760me | 15310as | 15400af | 15575as |
| | | | 17640af | 17790as | 17830af | 21470af |
| 0800 | 0900 | | USA, American Forces Network | | | 4319usb |
| | | | 5446usb | 5765usb | 6350usb | 7811usb |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | 10320usb | 12133usb | 13362usb | |
| 0800 | 0900 | | USA, EWTN Vandiver AL | | 11520af | |
| 0800 | 0900 | | USA, KNLS Anchor Point AK | | 7355as | |
| 0800 | 0900 | | USA, WBCQ Monticello ME | | 5110am | 7415am |
| 0800 | 0900 | | USA, WBOH Newport NC | | 5920am | |
| 0800 | 0900 | | USA, WHRA Greenbush ME | | 7335va | |
| 0800 | 0900 | Sat/Sun | USA, WHRI Cypress Creek SC | | | 5875na |
| 0800 | 0900 | | USA, WHRI Cypress Creek SC | | | 7385na |
| | | | 11565na | | | |
| 0800 | 0900 | | USA, WRMI Miami FL | | 9955am | |
| 0800 | 0900 | | USA, WTJC Newport NC | | 9370na | |
| 0800 | 0900 | | USA, WWCR Nashville TN | | 3215na | 5070na |
| | | | 5890na | 5935na | | |
| 0800 | 0900 | | USA, WWRB Manchester TN | | 3185va | |
| 0800 | 0900 | | USA, WYFR/Family Radio Worldwide | | | 5985am |
| | | | 6915na | | | |
| 0800 | 0900 | | Uzbekistan, CVC Intl-The Voice Asia | | | 15555as |
| | | | 15555as | | | |
| 0800 | 0900 | vl | Vanuatu, Radio Vanuatu | | 7260do | |
| 0800 | 0900 | vl | Zambia CVC/ The Voice Africa | | | 6065af |
| | | | 13590af | | | |
| 0805 | 0900 | thf | Guam, KTWR/TWR | | 15190as | |
| 0820 | 0900 | w | Guam, KTWR/TWR | | 15170as | |
| 0830 | 0900 | | Australia, ABC NT Katherine | | 2485do | |
| 0830 | 0900 | | Australia, ABC NT Tennant Creek | | | 2325do |
| 0830 | 0900 | | Australia, CVC International | | 15555as | |
| 0835 | 0900 | m | Guam, KTWR/TWR | | 15170as | |
| 0855 | 0900 | mtwhf | Guam, KTWR/TWR | | 11840pa | |

## 0900 UTC - 5AM EDT / 4AM CDT / 2AM PDT

| | | | | | | |
|---|---|---|---|---|---|---|
| 0900 | 0927 | | Czech Rep, Radio Prague | | 9880am | 9955na |
| | | | 21745af | | | |
| 0900 | 0930 | | Australia, HCJB Global | | 11750pa | |
| 0900 | 0930 | mtwhf | Guam, KTWR/TWR | | 11840pa | |
| 0900 | 0930 | | Japan, NHK World Radio Japan | | | 9625pa |
| | | | 9825pa | 11815as | 15590as | |
| 0900 | 0930 | | Uzbekistan, CVC Intl-The Voice Asia | | | 15555as |
| | | | 15555as | | | |
| 0900 | 1000 | | Anguilla, Worldwide Univ Network | | | 6090am |
| 0900 | 1000 | | Australia, ABC NT Alice Springs | | | 2310do |
| | | | 4835do | | | |
| 0900 | 1000 | | Australia, ABC NT Katherine | | 2485do | |
| 0900 | 1000 | | Australia, ABC NT Tennant Creek | | | 2325do |
| 0900 | 1000 | | Australia, Radio Australia | | 9475va | 9580va |
| | | | 9590va | 11945as | 12080as | |
| 0900 | 1000 | | Canada, CFRX Toronto ON | | 6070na | |
| 0900 | 1000 | | Canada, CFVP Calgary AB | | 6030na | |
| 0900 | 1000 | | Canada, CKZN St John's NF | | 6160na | |
| 0900 | 1000 | | Canada, CKZU Vancouver BC | | 6160na | |
| 0900 | 1000 | | China, China Radio International | | | 11620as |
| | | | 15210va | 15270eu | 15350as | 15625af |
| | | | 17490eu | 17570eu | 17690va | 17750as |
| 0900 | 1000 | | Germany, Deutsche Welle | | 15340as | 17705as |
| 0900 | 1000 | DRM | Germany, Deutsche Welle | | 9545eu | 13810eu |
| 0900 | 1000 | | Guyana, Voice of Guyana | | 3291do | |
| 0900 | 1000 | vl | Liberia, ELWA | 4760do | 6070al | |
| 0900 | 1000 | | Malaysia, RTM/Traxx FM | | 7295as | |
| 0900 | 1000 | | New Zealand, Radio NZ International | | | 6170pa |
| 0900 | 1000 | DRM | New Zealand, Radio NZ International | | | 7285pa |
| 0900 | 1000 | | Nigeria, Radio Nigeria/Kaduna | | | 4770do |
| 0900 | 1000 | | Nigeria, Voice of Nigeria/Lagos | | | 9690af |
| 0900 | 1000 | | Palau, T8WH/World Harvest | | 9930as | 15700as |
| 0900 | 1000 | vl | Papua New Guinea, R East New Britain | | | 3385do |
| 0900 | 1000 | vl | Papua New Guinea, Wantok R. Light | | | 7325do |
| 0900 | 1000 | | Russia, Voice of Russia | | 15470as | 15610as |
| | | | 21790as | | | |
| 0900 | 1000 | DRM | Russia, Voice of Russia | | 12060eu | |
| 0900 | 1000 | | Saudi Arabia, BSKSA | | 15250af | |
| 0900 | 1000 | vl | Solomon Islands, SIBC | | 5020do | |
| 0900 | 1000 | | South Africa, Channel Africa | | 9625af | |
| 0900 | 1000 | | Swaziland, TWR | 6120af | | |
| 0900 | 1000 | | UK, BBC World Service | | 6190af | 6195as |
| | | | 9740as | 9860af | 11760me | 15310as |
| | | | 15400af | 15575as | 17640af | 17760as |
| | | | 17790as | 17830af | 21470af | 21660as |
| 0900 | 1000 | | Ukraine, R Ukraine International | | | 11550eu |
| 0900 | 1000 | | USA, American Forces Network | | | 4319usb |
| | | | 5446usb | 5765usb | 6350usb | 7811usb |
| | | | 10320usb | 12133usb | 13362usb | |
| 0900 | 1000 | | USA, EWTN Vandiver AL | | 11640as | |
| 0900 | 1000 | | USA, WBCQ Monticello ME | | 5110am | 7415am |
| 0900 | 1000 | | USA, WBOH Newport NC | | 5920am | |
| 0900 | 1000 | smtwhf | USA, WHRI Cypress Creek SC | | | 9425na |
| 0900 | 1000 | Sat | USA, WHRI Cypress Creek SC | | | 7465na |
| 0900 | 1000 | | USA, WHRI Cypress Creek SC | | | 7385na |
| | | | 11565na | | | |
| 0900 | 1000 | | USA, WRMI Miami FL | | 9955am | |
| 0900 | 1000 | | USA, WTJC Newport NC | | 9370na | |
| 0900 | 1000 | | USA, WWCR Nashville TN | | 5070na | 5890na |
| | | | 5935na | 9985na | | |
| 0900 | 1000 | | USA, WWRB Manchester TN | | 3185va | |
| 0900 | 1000 | | USA, WYFR/Family Radio Worldwide | | | 5950na |
| | | | 6915na | 9755as | | |
| 0900 | 1000 | vl | Vanuatu, Radio Vanuatu | | 7260do | |
| 0900 | 1000 | vl | Zambia CVC/ The Voice Africa | | | 6065af |
| | | | 13590af | | | |
| 0915 | 0930 | Sat | Guam, KTWR/TWR | | 11840pa | |
| 0930 | 1000 | | Australia, CVC International | | 15555as | |
| 0930 | 1000 | Sun | Italy, NEXUS/IRRS | | 9510va | |

## 1000 UTC - 6AM EDT / 5AM CDT / 3AM PDT

| | | | | | | |
|---|---|---|---|---|---|---|
| 1000 | 1004 | | Pakistan, Radio Pakistan | | 15100as | 17835as |
| 1000 | 1030 | | Vietnam, Voice of Vietnam | | 9840as | 12020as |
| 1000 | 1057 | | Netherlands, R Netherlands Worldwide | | | 12065as |
| | | | 15110as | 11895as | | |
| 1000 | 1057 | | North Korea, Voice of Korea | | 11710sa | 11735as |
| | | | 13650as | 15180sa | | |
| 1000 | 1058 | | New Zealand, Radio NZ International | | | 6170pa |
| 1000 | 1100 | | Anguilla, Worldwide Univ Network | | | 11775am |
| 1000 | 1100 | | Australia, ABC NT Alice Springs | | | 2310do |
| | | | 4835do | | | |
| 1000 | 1100 | | Australia, ABC NT Katherine | | 2485do | |
| 1000 | 1100 | | Australia, ABC NT Tennant Creek | | | 2325do |
| 1000 | 1100 | | Australia, CVC International | | 15555as | |
| 1000 | 1100 | | Australia, Radio Australia | | 9475va | 9580va |
| | | | 9590va | 11945as | 12080as | |
| 1000 | 1100 | | Canada, CFRX Toronto ON | | 6070na | |
| 1000 | 1100 | | Canada, CFVP Calgary AB | | 6030na | |
| 1000 | 1100 | | Canada, CKZN St John's NF | | 6160na | |
| 1000 | 1100 | | Canada, CKZU Vancouver BC | | 6160na | |
| 1000 | 1100 | | China, China Radio International | | | 6040na |
| | | | 6090as | 11610as | 11635as | 11750na |
| | | | 13590as | 13620as | 13720as | 15190as |
| | | | 15350as | 17490eu | | |
| 1000 | 1100 | DRM | Germany, Deutsche Welle | | 9545eu | 13810eu |
| 1000 | 1100 | | Guyana, Voice of Guyana | | 3291do | |
| 1000 | 1100 | | India, All India Radio | | 7270as | 13695va |
| | | | 15070as | 15260as | 15410pa | 17510pa |
| | | | 17800pa | 17895pa | | |
| 1000 | 1100 | | Indonesia, Voice of Indonesia | | 9526va | 11784al |
| 1000 | 1100 | Sun | Italy, NEXUS/IRRS | | 9510va | |
| 1000 | 1100 | | Malaysia, RTM/Traxx FM | | 7295as | |
| 1000 | 1100 | DRM | New Zealand, Radio NZ International | | | 7285pa |
| 1000 | 1100 | | Nigeria, Radio Nigeria/Kaduna | | | 4770do |
| 1000 | 1100 | | Nigeria, Voice of Nigeria/Lagos | | | 9690af |
| 1000 | 1100 | | Palau, T8WH/World Harvest | | 9930as | 15700as |
| 1000 | 1100 | vl | Papua New Guinea, R East New Britain | | | 3385do |
| 1000 | 1100 | vl | Papua New Guinea, Wantok R. Light | | | 7325do |
| 1000 | 1100 | | Russia, Voice of Russia | | 15470as | 15610as |
| 1000 | 1100 | | Saudi Arabia, BSKSA | | 15250af | |
| 1000 | 1100 | vl | Solomon Islands, SIBC | | 5020do | |
| 1000 | 1100 | | South Africa, Channel Africa | | 9625af | |
| 1000 | 1100 | | Swaziland, TWR | 6120af | | |
| 1000 | 1100 | Sat/Sun | UK, BBC World Service | | 15400af | 17830af |
| 1000 | 1100 | | UK, BBC World Service | | 6190af | 6195as |
| | | | 9545eu | 9740as | 9860af | 11760me |
| | | | 15310af | 15575as | 17640af | 17760as |
| | | | 17790as | 21470af | 21660as | |
| 1000 | 1100 | | USA, American Forces Network | | | 4319usb |
| | | | 5446usb | 5765usb | 6350usb | 7811usb |
| | | | 10320usb | 12133usb | 13362usb | |
| 1000 | 1100 | | USA, EWTN Vandiver AL | | 11640as | |
| 1000 | 1100 | | USA, KNLS Anchor Point AK | | 6890as | |
| 1000 | 1100 | | USA, WBCQ Monticello ME | | 5110am | 7415am |
| 1000 | 1100 | | USA, WBOH Newport NC | | 5920am | |
| 1000 | 1100 | | USA, WHRI Cypress Creek SC | | | 7385na |
| | | | 11565na | | | |
| 1000 | 1100 | | USA, WRMI Miami FL | | 9955am | |
| 1000 | 1100 | | USA, WTJC Newport NC | | 9370na | |
| 1000 | 1100 | | USA, WWCR Nashville TN | | 5070na | 5890na |
| | | | 5935na | 9985na | | |
| 1000 | 1100 | | USA, WWRB Manchester TN | | 3185va | |
| 1000 | 1100 | | USA, WYFR/Family Radio Worldwide | | | 5950na |
| | | | 6890na | 6915na | 9555sa | |
| 1000 | 1100 | vl | Zambia CVC/ The Voice Africa | | | 6065af |
| | | | 13590af | | | |
| 1015 | 1045 | Sun | UK, Bible Voice Broadcasting | | 5910as | |
| 1030 | 1057 | | Czech Rep, Radio Prague | | 9880eu | 11665eu |
| 1030 | 1100 | | Iran, VOIRI/ IRIB | | 15600as | 17660as |
| 1030 | 1100 | | Mongolia, Voice of Mongolia | | 9665as | 12085as |
| 1059 | 1100 | | New Zealand, Radio NZ International | | | 9655pa |

## 1100 UTC - 7AM EDT / 6AM CDT / 4AM PDT

| | | | | | | |
|---|---|---|---|---|---|---|
| 1100 | 1103 | mtwhf | Croatia, Voice of Croatia | 6165eu | | |
| 1100 | 1127 | | Iran, VOIRI/ IRIB | 15600as | 17660as | |
| 1100 | 1130 | | Australia, CVC International | 15555as | | |
| 1100 | 1130 | | China, China Radio International | | | 6060as |
| 1100 | 1130 | f/ DRM | Japan, NHK World Radio Japan | | | 9760eu |
| 1100 | 1130 | | Vietnam, Voice of Vietnam | 7285as | | |
| 1100 | 1145 | | USA, WYFR/Family Radio Worldwide | | | 9550am |
| | | | 9755sa | | | |
| 1100 | 1156 | | Romania, R Romania International | | | 11775af |
| | | | 15210af | 15430af | 17730af | |
| 1100 | 1158 | DRM | New Zealand, Radio NZ International | | | 7285pa |
| 1100 | 1200 | | Anguilla, Worldwide Univ Network | | | 11775am |
| 1100 | 1200 | | Australia, ABC NT Alice Springs | | | 2310do |
| | | | 4835do | | | |
| 1100 | 1200 | | Australia, ABC NT Katherine | 2485do | | |
| 1100 | 1200 | | Australia, ABC NT Tennant Creek | | | 2325do |
| 1100 | 1200 | DRM | Australia, Radio Australia | 5995pa | | |
| 1100 | 1200 | | Australia, Radio Australia | 6020va | | 9475as |
| | | | 9560as | 9580va | 9590va | 11945as |
| 1100 | 1200 | Sat/Sun | Canada, CBC NQ SW Service | 9625na | | |
| 1100 | 1200 | | Canada, CFRX Toronto ON | 6070na | | |
| 1100 | 1200 | | Canada, CFVP Calgary AB | 6030na | | |
| 1100 | 1200 | | Canada, CKZN St John's NF | 6160na | | |
| 1100 | 1200 | | Canada, CKZU Vancouver BC | 6160na | | |
| 1100 | 1200 | | China, China Radio International | | | 5955as |
| | | | 6040na | 11650as | 11660as | 11795as |
| | | | 13645as | 13650eu | 13790eu | 17490eu |
| 1100 | 1200 | DRM | Germany, Deutsche Welle | 9545eu | | 13810eu |
| 1100 | 1200 | Sun | Italy, NEXUS/IRRS | 9510va | | |
| 1100 | 1200 | | Malaysia, RTM/Traxx FM | 7295as | | |
| 1100 | 1200 | | New Zealand, Radio NZ International | | | 9655pa |
| 1100 | 1200 | | Nigeria, Radio Nigeria/Kaduna | | | 4770do |
| 1100 | 1200 | | Nigeria, Voice of Nigeria/Lagos | | | 9690af |
| 1100 | 1200 | | Palau, T8WH/World Harvest | 9930as | | 15700as |
| 1100 | 1200 | vl | Papua New Guinea, R East New Britain | | | 3385do |
| 1100 | 1200 | vl | Papua New Guinea, Wantok R. Light | | | 7325do |
| 1100 | 1200 | | Russia, Voice of Russia | 12065as | | 15470as |
| 1100 | 1200 | | Saudi Arabia, BSKSA | 15250af | | |
| 1100 | 1200 | vl | Solomon Islands, SIBC | 5020do | | 9545al |
| 1100 | 1200 | | South Africa, Channel Africa | 9625af | | |
| 1100 | 1200 | | Taiwan, R Taiwan International | | | 7445as |
| | | | 11715as | | | |
| 1100 | 1200 | | UK, BBC World Service | 6190af | | 6195as |
| | | | 9740as | 9860af | 9545eu | 11760me |
| | | | 15310as | 15340as | 15400af | 15575as |
| | | | 17640af | 17760as | 17790as | 17830af |
| | | | 21470af | | | |
| 1100 | 1200 | | Ukraine, R Ukraine International | | | 11550eu |
| 1100 | 1200 | | USA, American Forces Network | | | 4319usb |
| | | | 5446usb | 5765usb | 6350usb | 7811usb |
| | | | 10320usb | 12133usb | 13362usb | |
| 1100 | 1200 | | USA, EWTN Vandiver AL | 11640as | | |
| 1100 | 1200 | | USA, WBCQ Monticello ME | 5110am | | 7415am |
| 1100 | 1200 | | USA, WBOH Newport NC | 5920am | | |
| 1100 | 1200 | | USA, WHRI Cypress Creek SC | | | 7385va |
| | | | 9425sa | | | |
| 1100 | 1200 | | USA, WRMI Miami FL | 9955am | | |
| 1100 | 1200 | | USA, WTJC Newport NC | 9370na | | |
| 1100 | 1200 | | USA, WWCR Nashville TN | 5890na | | 7490na |
| | | | 5935na | 15825na | | |
| 1100 | 1200 | | USA, WWRB Manchester TN | 3185va | | |
| 1100 | 1200 | | USA, WYFR/Family Radio Worldwide | | | 5950af |
| | | | 5985na | 7730sa | 9625sa | |
| 1100 | 1200 | vl | Zambia CVC/ The Voice Africa | | | 6065af |
| | | | 13590af | | | |
| 1115 | 1130 | mtwhfa | UK, Bible Voice Broadcasting | 5945as | | |
| 1115 | 1145 | Sun | UK, Bible Voice Broadcasting | 5945as | | |
| 1130 | 1200 | | Australia, CVC International | 13635as | | |
| 1130 | 1200 | | Bulgaria, Radio Bulgaria | 11700eu | | 15700eu |
| 1130 | 1200 | | Vatican City, Vatican Radio | 15565me | | 17765me |
| 1130 | 1200 | | Vietnam, Voice of Vietnam | 9840as | | 12020as |
| 1145 | 1200 | | UK, Bible Voice Broadcasting | 5945as | | |

## 1200 UTC - 8AM EDT / 7AM CDT / 5AM PDT

| | | | | | | |
|---|---|---|---|---|---|---|
| 1200 | 1230 | | China, China Radio International | | | 11780as |
| 1200 | 1230 | | France, Radio France International | | | 17800af |
| | | | 21620af | | | |
| 1200 | 1230 | | Germany, AWR-Europe | 15435as | | |
| 1200 | 1230 | | Japan, NHK World Radio Japan | | | 6120na |
| | | | 9625pa | 9695as | 9790eu | |
| 1200 | 1230 | | Saudi Arabia, BSKSA | 15250af | | |
| 1200 | 1245 | | Australia, HCJB Global | 15400as | | |
| 1200 | 1245 | | USA, WYFR/Family Radio Worldwide | | | 5950na |
| | | | 5985na | | | |
| 1200 | 1258 | | New Zealand, Radio NZ International | | | 9655pa |
| 1200 | 1300 | | Anguilla, Worldwide Univ Network | | | 11775am |
| 1200 | 1300 | | Australia, ABC NT Alice Springs | | | 2310do |
| | | | 4835do | | | |
| 1200 | 1300 | | Australia, ABC NT Katherine | 2485do | | |
| 1200 | 1300 | | Australia, ABC NT Tennant Creek | | | 2325do |
| 1200 | 1300 | | Australia, CVC International | 13635as | | |
| 1200 | 1300 | | Australia, Radio Australia | 6020va | | 9475as |
| | | | 9560pa | 9580va | 9590va | 11945as |
| 1200 | 1300 | DRM | Australia, Radio Australia | 5995va | | 12080pa |
| 1200 | 1300 | Sat/Sun | Canada, CBC NQ SW Service | 9625na | | |
| 1200 | 1300 | | Canada, CFRX Toronto ON | 6070na | | |
| 1200 | 1300 | | Canada, CFVP Calgary AB | 6030na | | |
| 1200 | 1300 | | Canada, CKZN St John's NF | 6160na | | |
| 1200 | 1300 | | Canada, CKZU Vancouver BC | 6160na | | |
| 1200 | 1300 | | China, China Radio International | | | 5955as |
| | | | 9460as | 9600as | 9645as | 9730as |
| | | | 9760va | 11650as | 11660as | 11690as |
| | | | 11760va | 11980as | 13645as | 13650eu |
| | | | 17490eu | | | |
| 1200 | 1300 | DRM | Germany, Deutsche Welle | 9545eu | | 13810eu |
| 1200 | 1300 | Sun | Latvia, Radio SWH | 9290eu | | |
| 1200 | 1300 | vl | Libya, Voice of Africa | 17725af | | 21695af |
| 1200 | 1300 | | Malaysia, RTM/Traxx FM | 7295as | | |
| 1200 | 1300 | | Nigeria, Radio Nigeria/Kaduna | | | 4770do |
| 1200 | 1300 | | Nigeria, Voice of Nigeria/Lagos | | | 9690af |
| 1200 | 1300 | | Palau, T8WH/World Harvest | 9930as | | 12130as |
| 1200 | 1300 | vl | Papua New Guinea, Wantok R. Light | | | 7325do |
| 1200 | 1300 | | Poland, Polish Radio | 7330eu | | 9525eu |
| 1200 | 1300 | | Russia, Voice of Russia | 7330as | | 12065as |
| | | | 15470as | | | |
| 1200 | 1300 | vl | Solomon Islands, SIBC | 5020do | | 9545al |
| 1200 | 1300 | | South Korea, KBS World Radio | | | 9650na |
| 1200 | 1300 | | UK, BBC World Service | 5875as | | 6190af |
| | | | 6195as | 9545eu | 9740as | 9860af |
| | | | 11750as | 11760me | 15310as | 15575as |
| | | | 17640af | 17790as | 17830af | 21470af |
| 1200 | 1300 | | USA, American Forces Network | | | 4319usb |
| | | | 5446usb | 5765usb | 6350usb | 7811usb |
| | | | 10320usb | 12133usb | 13362usb | |
| 1200 | 1300 | | USA, EWTN Vandiver AL | 11530as | | |
| 1200 | 1300 | | USA, KNLS Anchor Point AK | 7355as | | 9780as |
| 1200 | 1300 | | USA, Voice of America | 6140va | | 7575va |
| | | | 9510va | 9760va | 12075va | |
| 1200 | 1300 | | USA, WBCQ Monticello ME | 5110am | | 7415am |
| | | | 9330am | 15420am | 17495am | |
| 1200 | 1300 | | USA, WBOH Newport NC | 5920am | | |
| 1200 | 1300 | | USA, WHRA Greenbush ME | 15710va | | |
| 1200 | 1300 | | USA, WHRI Cypress Creek SC | | | 7315va |
| | | | 7385na | 9410va | | |
| 1200 | 1300 | | USA, WRMI Miami FL | 9955am | | |
| 1200 | 1300 | | USA, WTJC Newport NC | 9370na | | |
| 1200 | 1300 | | USA, WWCR Nashville TN | 7490na | | 9980na |
| | | | 13845na | 15825na | | |
| 1200 | 1300 | | USA, WWRB Manchester TN | 9385va | | |
| 1200 | 1300 | | USA, WYFR/Family Radio Worldwide | | | 17555am |
| | | | 17795na | | | |
| 1200 | 1300 | vl | Zambia CVC/ The Voice Africa | | | 6065af |
| | | | 13590af | | | |
| 1215 | 1300 | | Egypt, Radio Cairo | 17870as | | |
| 1230 | 1300 | | Bangladesh, Bangla Betar | 7250as | | |
| 1230 | 1300 | | Thailand, Radio Thailand World Svc | | | 9890va |
| 1230 | 1300 | | Turkey, Voice of Turkey | 15420eu | | 15520as |
| 1230 | 1300 | | Vietnam, Voice of Vietnam | 9840as | | 12020as |
| 1245 | 1300 | smtwhf | Australia, HCJB Global | 15400as | | |

## 1300 UTC - 9AM EDT / 8AM CDT / 6AM PDT

| | | | | | | |
|---|---|---|---|---|---|---|
| 1300 | 1325 | | Turkey, Voice of Turkey | 15450eu | | 15520as |
| 1300 | 1327 | | Czech Rep, Radio Prague | 13580af | | 17540af |
| 1300 | 1330 | vl | Australia, HCJB Global | 15400as | | |
| 1300 | 1330 | | Egypt, Radio Cairo | 17870as | | |
| 1300 | 1357 | | North Korea, Voice of Korea | 9335na | | 11710na |
| | | | 13760eu | 15245eu | | |
| 1300 | 1400 | | Anguilla, Worldwide Univ Network | | | 11775am |
| 1300 | 1400 | | Australia, CVC International | 13635as | | |
| 1300 | 1400 | | Australia, Radio Australia | 6020va | | 9560as |
| | | | 9580va | 9590va | | |
| 1300 | 1400 | DRM | Australia, Radio Australia | 5995va | | 12080pa |
| 1300 | 1400 | Sat/Sun | Canada, CBC NQ SW Service | 9625na | | |
| 1300 | 1400 | | Canada, CFRX Toronto ON | 6070na | | |
| 1300 | 1400 | | Canada, CFVP Calgary AB | 6030na | | |
| 1300 | 1400 | | Canada, CKZN St John's NF | 6160na | | |
| 1300 | 1400 | | Canada, CKZU Vancouver BC | 6160na | | |
| 1300 | 1400 | | China, China Radio International | | | 5995as |
| | | | 9570na | 9650na | 9730as | 9760va |
| | | | 9870as | 11660as | 11980as | 13610eu |
| | | | 13755as | 13790eu | 15260na | |

SHORTWAVE GUIDE

| | | | | | | |
|---|---|---|---|---|---|---|
| 1300 | 1400 | DRM | Germany, Deutsche Welle | 13810eu | | |
| 1300 | 1400 | | Indonesia, Voice of Indonesia | 9526va | 11784al | |
| 1300 | 1400 | vl | Libya, Voice of Africa | 17725af | 21695af | |
| 1300 | 1400 | | Malaysia, RTM/Traxx FM | 7295as | | |
| 1300 | 1400 | | New Zealand, Radio NZ International | 6170pa | | |
| 1300 | 1400 | | Nigeria, Radio Nigeria/Kaduna | 4770do | | |
| 1300 | 1400 | | Nigeria, Voice of Nigeria/Lagos | 9690af | | |
| 1300 | 1400 | | Palau, T8WH/World Harvest | 9930as | 11685as | |
| 1300 | 1400 | vl | Papua New Guinea, Wantok R. Light | 7325do | | |
| 1300 | 1400 | | Russia, Voice of Russia | 7330as | 12065as | |
| 1300 | 1400 | vl | Solomon Islands, SIBC | 5020do | 9545al | |
| 1300 | 1400 | | South Korea, KBS World Radio | 9570na | | |
| | | | 9770as | | | |
| 1300 | 1400 | DRM | UK, BBC World Service | 9545eu | 13810eu | |
| 1300 | 1400 | | UK, BBC World Service | 5875as | 6190af | |
| | | | 6195as | 9545eu | 9740as | 9860af |
| | | | 11760me | 15310as | 15420af | 15575as |
| | | | 17640af | 17790as | 17830af | 21470af |
| 1300 | 1400 | | USA, American Forces Network | | | 4319usb |
| | | | 5446usb | 5765usb | 6350usb | 7811usb |
| | | | 10320usb | 12133usb | 13362usb | |
| 1300 | 1400 | | USA, EWTN Vandiver AL | 11530as | | |
| 1300 | 1400 | | USA, KJES Vado NM | 11715na | | |
| 1300 | 1400 | | USA, Voice of America | 7575va | 9510va | |
| | | | 9760va | | | |
| 1300 | 1400 | | USA, WBCQ Monticello ME | 5110am | 7415am | |
| | | | 9330am | 15420am | 17495am | |
| 1300 | 1400 | | USA, WBOH Newport NC | 5920am | | |
| 1300 | 1400 | | USA, WHRA Greenbush ME | 15710va | | |
| 1300 | 1400 | Sat/Sun | USA, WHRI Cypress Creek SC | | 7315va | |
| | | | 9840na | | | |
| 1300 | 1400 | | USA, WHRI Cypress Creek SC | | 9495va | |
| 1300 | 1400 | | USA, WRMI Miami FL | 9955am | | |
| 1300 | 1400 | | USA, WTJC Newport NC | 9370na | | |
| 1300 | 1400 | | USA, WWCR Nashville TN | 7490na | 9980na | |
| | | | 13845na | 15825na | | |
| 1300 | 1400 | | USA, WWRB Manchester TN | 9385va | | |
| 1300 | 1400 | | USA, WYFR/Family Radio Worldwide | | 11830am | |
| | | | 11865na | 11910na | 17795na | |
| 1300 | 1400 | vl | Zambia CVC/ The Voice Africa | | 6065af | |
| | | | 13590af | | | |
| 1310 | 1340 | | Japan, NHK World Radio Japan | | 11985as | |
| 1330 | 1357 | fa/ DRM | Czech Rep, Radio Prague | 9850eu | | |
| 1330 | 1400 | mtwhfa | Guam, KSDA/ AWR | 15275as | | |
| 1330 | 1400 | hfa | Guam, KSDA/ AWR | 11880as | | |
| 1330 | 1400 | | India, All India Radio | 9690as | 11620as | |
| | | | 13710as | | | |
| 1330 | 1400 | | Laos, National Radio | 7145as | | |
| 1330 | 1400 | | Sweden, Radio Sweden | 15735va | | |
| 1330 | 1400 | | Vietnam, Voice of Vietnam | 9840as | 12020as | |

## 1400 UTC - 10AM EDT / 9AM CDT / 7AM PDT

| | | | | | | |
|---|---|---|---|---|---|---|
| 1400 | 1427 | | Czech Rep, Radio Prague | 9955na | | |
| 1400 | 1430 | | Australia, Radio Australia | 5995va | 6080va | |
| | | | 7240va | 9590va | | |
| 1400 | 1430 | | China, China Radio International | | 7325as | |
| 1400 | 1430 | Sun | Germany, Pan American BC | 15205as | | |
| 1400 | 1430 | ` | Japan, NHK World Radio Japan | | 11705as | |
| | | | 11985as | 13630eu | 21560af | |
| 1400 | 1430 | | Thailand, Radio Thailand World Svc | | 9455va | |
| 1400 | 1430 | Sun | United Arab Emirates, FEBA | 12025as | | |
| 1400 | 1457 | | Netherlands, R Netherlands Worldwide | | 5825as | |
| | | | 7530as | 9345as | 11835as | 15815as |
| 1400 | 1500 | | Anguilla, Worldwide Univ Network | | 11775am | |
| 1400 | 1500 | | Australia, CVC International | 13635as | | |
| 1400 | 1500 | | Australia, HCJB Global | 15425as | | |
| 1400 | 1500 | | Bhutan, Bhutan Broadcasting Svc | | 6035as | |
| 1400 | 1500 | Sat/Sun | Canada, CBC NQ SW Service | 9625na | | |
| 1400 | 1500 | | Canada, CFRX Toronto ON | 6070na | | |
| 1400 | 1500 | | Canada, CFVP Calgary AB | 6030na | | |
| 1400 | 1500 | | Canada, CKZN St John's NF | 6160na | | |
| 1400 | 1500 | | Canada, CKZU Vancouver BC | 6160na | | |
| 1400 | 1500 | | China, China Radio International | | 5955as | |
| | | | 9870as | 11675as | 11765as | 13740na |
| | | | 13710eu | 13790eu | | |
| 1400 | 1500 | | Germany, CVC Intl-Christian Vision | | 17770af | |
| 1400 | 1500 | DRM | Germany, Deutsche Welle | 15780eu | | |
| 1400 | 1500 | | Germany, Overcomer Ministries | | 6110eu | |
| | | | 13810eu | | | |
| 1400 | 1500 | | India, All India Radio | 9690as | 11620as | |
| | | | 13710as | | | |
| 1400 | 1500 | vl | Libya, Voice of Africa | 17725af | 21695af | |
| 1400 | 1500 | | Malaysia, RTM/Traxx FM | 7295as | | |
| 1400 | 1500 | | New Zealand, Radio NZ International | | 6170pa | |
| 1400 | 1500 | | Nigeria, Radio Nigeria/Kaduna | | 4770do | |
| 1400 | 1500 | | Nigeria, Voice of Nigeria/Lagos | | 9690af | |
| 1400 | 1500 | | Oman, Radio Oman | 15140as | | |
| 1400 | 1500 | | Palau, T8WH/World Harvest | 9930as | 9965as | |
| 1400 | 1500 | vl | Papua New Guinea, Wantok R. Light | | 7325do | |
| 1400 | 1500 | | Russia, Voice of Russia | 6045as | 7330as | |
| | | | 9850as | 15605as | | |
| 1400 | 1500 | DRM | Russia, Voice of Russia | 9445as | 9750eu | |
| 1400 | 1500 | vl | Solomon Islands, SIBC | 5020do | 9545al | |
| 1400 | 1500 | | UK, BBC World Service | 5875as | 6190af | |
| | | | 6195as | 7230af | 9545eu | 9740as |
| | | | 11920as | 12095as | 15310as | 17640af |
| | | | 17830af | 21470af | | |
| 1400 | 1500 | DRM | UK, BBC World Service | 9545eu | 15780eu | |
| 1400 | 1500 | Sat/Sun | UK, Bible Voice Broadcasting | 17805as | | |
| 1400 | 1500 | | USA, American Forces Network | | | 4319usb |
| | | | 5446usb | 5765usb | 6350usb | 7811usb |
| | | | 10320usb | 12133usb | 13362usb | |
| 1400 | 1500 | | USA, EWTN Vandiver AL | 11530as | | |
| 1400 | 1500 | | USA, KJES Vado NM | 11715na | | |
| 1400 | 1500 | | USA, KNLS Anchor Point AK | 7355as | | |
| 1400 | 1500 | | USA, Voice of America | 4930af | 6080af | |
| | | | 7545va | 9760va | 11715va | 13570va |
| | | | 15530va | 15580af | 17585af | 17740va |
| 1400 | 1500 | | USA, WBCQ Monticello ME | 5110am | 7415am | |
| | | | 9330am | 15420am | 17495am | |
| 1400 | 1500 | | USA, WBOH Newport NC | 5920am | | |
| 1400 | 1500 | Sat/Sun | USA, WHRI Cypress Creek SC | | 9840na | |
| | | | 11785na | 15195na | | |
| 1400 | 1500 | | USA, WHRI Cypress Creek SC | | 9495va | |
| 1400 | 1500 | | USA, WINB Red Lion PA | 13570ca | | |
| 1400 | 1500 | | USA, WRMI Miami FL | 9955na | | |
| 1400 | 1500 | | USA, WTJC Newport NC | 9370na | | |
| 1400 | 1500 | | USA, WWCR Nashville TN | 7490na | 9980na | |
| | | | 13845na | 15825na | | |
| 1400 | 1500 | | USA, WWRB Manchester TN | 9385va | | |
| 1400 | 1500 | | USA, WYFR/Family Radio Worldwide | | 11830am | |
| | | | 11910na | 13695as | 15715as | 17795na |
| 1400 | 1500 | vl | Zambia CVC/ The Voice Africa | | 6065af | |
| | | | 13590af | | | |
| 1415 | 1430 | mtwhfa | Germany, Pan American BC | 15205as | | |
| 1415 | 1430 | | Nepal, Radio Nepal | 5005as | | |
| 1415 | 1450 | | Guam, KTWR/TWR | 9975as | | |
| 1430 | 1445 | Sun | Germany, Pan American BC | 15205as | | |
| 1430 | 1445 | vl/ mtwhf | Moldova, Radio PMR/Pridnestrovie | | 7370eu | |
| 1430 | 1500 | mtwhfa | Albania, Radio Tirana | 13625na | | |
| 1430 | 1500 | | Australia, Radio Australia | 5995va | 6080va | |
| | | | 7240va | 9475as | 9590va | 11660pa |
| 1430 | 1500 | | China, Central People's BS/CNR | | 6010do | |
| | | | 7350do | 9480do | | |
| 1430 | 1500 | | Ethiopia, Radio Ethiopia | 5990af | 7110af | |
| | | | 9704af | | | |
| 1430 | 1500 | DRM | South Korea, KBS World Radio | | 9660eu | |
| 1430 | 1500 | | Sweden, Radio Sweden | 13820va | | |

## 1500 UTC - 11AM EDT / 10AM CDT / 8AM PDT

| | | | | | | |
|---|---|---|---|---|---|---|
| 1500 | 1510 | mtwhfa | Turkmenistan, Turkmen Radio | 5015eu | | |
| 1500 | 1515 | Sun | UK, Bible Voice Broadcasting | 15680as | | |
| 1500 | 1528 | | Vietnam, Voice of Vietnam | 7285va | 9840va | |
| | | | 12020va | | | |
| 1500 | 1530 | | Australia, HCJB Global | 15425as | | |
| 1500 | 1530 | | China, China Radio International | | 9600as | |
| 1500 | 1530 | | Guam, KSDA/ AWR | 11720as | | |
| 1500 | 1530 | | Nigeria, Radio, National Svc/Abuja | | 7275do | |
| 1500 | 1530 | | UK, BBC World Service | 7385af | 11860af | |
| | | | 15420af | | | |
| 1500 | 1530 | Sat | UK, Bible Voice Broadcasting | 15295as | | |
| 1500 | 1530 | | UK, Sudan Radio Service | 17745af | | |
| 1500 | 1545 | | USA, WYFR/Family Radio Worldwide | | 15770sa | |
| 1500 | 1550 | | New Zealand, Radio NZ International | | 6170pa | |
| 1500 | 1557 | | Canada, R Canada International | | 11675as | |
| | | | 17720as | | | |
| 1500 | 1557 | vl | Libya, Voice of Africa | 17725af | 21695af | |
| 1500 | 1557 | | Netherlands, R Netherlands Worldwide | | 5825as | |
| | | | 7530as | 11835as | 15815as | |
| 1500 | 1557 | | North Korea, Voice of Korea | 9335na | 11710na | |
| | | | 13760eu | 15245eu | | |
| 1500 | 1600 | | Anguilla, Worldwide Univ Network | | 11775am | |
| 1500 | 1600 | | Australia, CVC International | 11730as | | |
| 1500 | 1600 | | Australia, Radio Australia | 5995va | 6080va | |
| | | | 7240va | 9475as | 9590va | 11660pa |
| 1500 | 1600 | Sat/Sun | Canada, CBC NQ SW Service | 9625na | | |
| 1500 | 1600 | | Canada, CFRX Toronto ON | 6070na | | |
| 1500 | 1600 | | Canada, CFVP Calgary AB | 6030na | | |
| 1500 | 1600 | | Canada, CKZN St John's NF | 6160na | | |
| 1500 | 1600 | | Canada, CKZU Vancouver BC | 6160na | | |
| 1500 | 1600 | | China, China Radio International | | 5955as | |
| | | | 6095as | 7160as | 7325as | 7405as |
| | | | 9720as | 9800as | 9870as | 11965eu |
| | | | 13640as | 13740na | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 1500 | 1600 | | Germany, CVC Intl-Christian Vision | | | 17770af |
| 1500 | 1600 | DRM | Germany, Deutsche Welle | 15780eu | | |
| 1500 | 1600 | | Germany, Overcomer Ministries | | | 6110eu |
| | | | 13810me | 17485af | | |
| 1500 | 1600 | | Italy, NEXUS/IRRS | 15650af | | |
| 1500 | 1600 | | Malaysia, RTM/Traxx FM | 7295as | | |
| 1500 | 1600 | | Myanmar, Myanma Radio | 5985as | | |
| 1500 | 1600 | | Nigeria, Radio Nigeria/Kaduna | | | 4770do |
| 1500 | 1600 | | Nigeria, Voice of Nigeria/Lagos | | | 9690af |
| 1500 | 1600 | | Palau, T8WH/World Harvest | 9905as | | 9965as |
| 1500 | 1600 | vl | Papua New Guinea, Wantok R. Light | | | 7325do |
| 1500 | 1600 | | Russia, Voice of Russia | 4975me | | 9625as |
| | | | 9660as | 9735me | 9850as | 11985me |
| | | | 12040eu | 15605as | | |
| 1500 | 1600 | vl | Solomon Islands, SIBC | 5020do | | 9545al |
| 1500 | 1600 | | Uganda, Dunamis Shortwave | 4750af | | |
| 1500 | 1600 | DRM | UK, BBC World Service | 5790eu | | 15780eu |
| 1500 | 1600 | | UK, BBC World Service | 5790eu | | 5875as |
| | | | 5975as | 6190af | 6195as | 7230af |
| | | | 7385af | 9740as | 11920as | 12095eu |
| | | | 15310af | 15400af | 17640af | 17830af |
| | | | 21470af | | | |
| 1500 | 1600 | | USA, American Forces Network | | | 4319usb |
| | | | 5446usb | 5765usb | 6350usb | 7811usb |
| | | | 10320usb | 12133usb | 13362usb | |
| 1500 | 1600 | | USA, EWTN Vandiver AL | 15610eu | | |
| 1500 | 1600 | | USA, KJES Vado NM | 11715na | | |
| 1500 | 1600 | | USA, Voice of America | 4930af | | 6080af |
| | | | 6160va | 7545va | 7575va | 9485va |
| | | | 9700va | 12005va | 12150va | 13570af |
| | | | 15530va | 15550va | 15580af | 17895af |
| 1500 | 1600 | | USA, WBCQ Monticello ME | 5110am | | 7415am |
| | | | 9330am | 15420am | 17495am | |
| 1500 | 1600 | | USA, WBOH Newport NC | 5920am | | |
| 1500 | 1600 | Sat/Sun | USA, WHRI Cypress Creek SC | | | 9840na |
| | | | 11785na | 15195na | | |
| 1500 | 1600 | | USA, WHRI Cypress Creek SC | | | 9495va |
| 1500 | 1600 | | USA, WINB Red Lion PA | 13570ca | | |
| 1500 | 1600 | | USA, WRMI Miami FL | 9955na | | |
| 1500 | 1600 | | USA, WTJC Newport NC | 9370na | | |
| 1500 | 1600 | | USA, WWCR Nashville TN | 7490na | | 9980na |
| | | | 13845na | 15825na | | |
| 1500 | 1600 | | USA, WWRB Manchester TN | 9385va | | |
| 1500 | 1600 | | USA, WYFR/Family Radio Worldwide | | | 11830am |
| | | | 11910na | 17795na | | |
| 1500 | 1600 | vl | Zambia CVC/ The Voice Africa | | | 6065af |
| | | | 13590af | | | |
| 1505 | 1600 | DRM | Canada, R Canada International | | | 9800na |
| 1505 | 1600 | | Canada, R Canada International | | | 9515as |
| 1515 | 1530 | vl/ mtwhf | Moldova, Radio PMR/Pridnestrovie | | | 7370eu |
| 1530 | 1545 | | India, All India Radio | 7255as | | 9820as |
| | | | 9910as | | | |
| 1530 | 1550 | | Vatican City, Vatican Radio | 13765as | | 15235as |
| 1530 | 1600 | | Germany, AWR-Europe | 15335as | | |
| 1530 | 1600 | | Iran, VOIRI/ IRIB | 7305as | 9600as | |
| 1530 | 1600 | | Mongolia, Voice of Mongolia | 9665as | | 12085as |
| 1530 | 1600 | | Sweden, Radio Sweden | 13600va | | |
| 1530 | 1600 | Sat | UK, BBC World Service | 7385af | | 15420af |
| 1530 | 1600 | Sun | UK, Bible Voice Broadcasting | 13590me | | |
| 1530 | 1600 | | UK, Bible Voice Broadcasting | 15680as | | |
| 1530 | 1600 | Sat | UK, Bible Voice Broadcasting | 15680as | | |
| 1545 | 1600 | mtwhfa | UK, Bible Voice Broadcasting | 13590me | | |
| 1551 | 1600 | DRM | New Zealand, Radio NZ International | | | 6170pa |
| 1551 | 1600 | | New Zealand, Radio NZ International | | | 7285pa |

## 1600 UTC - 12PM EDT / 11AM CDT / 9AM PDT

| | | | | | | |
|---|---|---|---|---|---|---|
| 1600 | 1605 | Sun | Croatia, Voice of Croatia | 6165eu | | |
| 1600 | 1615 | mtwhfa | Croatia, Voice of Croatia | 6165eu | | |
| 1600 | 1615 | vl/ mtwhf | Moldova, Radio PMR/Pridnestrovie | | | 7370eu |
| 1600 | 1615 | | Pakistan, Radio Pakistan | 9385va | | 11565va |
| | | | 15100as | | | |
| 1600 | 1615 | | UK, Bible Voice Broadcasting | 13590me | | |
| 1600 | 1620 | t | UK, Bible Voice Broadcasting | 13590me | | |
| 1600 | 1627 | | Czech Rep, Radio Prague | 5930eu | | 17845na |
| 1600 | 1627 | | Iran, VOIRI/ IRIB | 7305as | 9600as | |
| 1600 | 1628 | | Vietnam, Voice of Vietnam | 7220va | | 7280va |
| | | | 9550va | 9730va | | |
| 1600 | 1630 | | Guam, KSDA/ AWR | 11720as | | 11805as |
| 1600 | 1630 | | Myanmar, Myanma Radio | 9730do | | |
| 1600 | 1630 | | Nigeria, Voice of Nigeria/Lagos | | | 9690af |
| 1600 | 1630 | | Yemen, Rep of Yemen Radio | 9780me | | |
| 1600 | 1645 | | USA, WYFR/Family Radio Worldwide | | | 11830am |
| | | | 11865na | | | |
| 1600 | 1657 | | North Korea, Voice of Korea | 9990va | | 11545va |
| 1600 | 1700 | | Anguilla, Worldwide Univ Network | | | 11775am |
| 1600 | 1700 | | Australia, CVC International | 9680as | | |
| 1600 | 1700 | | Australia, Radio Australia | 5995va | | 6080va |
| | | | 7240as | 9475va | 9580va | 9710as |
| | | | 11660pa | | | |
| 1600 | 1700 | Sat | Canada, CBC NQ SW Service | 9625na | | |
| 1600 | 1700 | | Canada, CFRX Toronto ON | 6070na | | |
| 1600 | 1700 | | Canada, CFVP Calgary AB | 6030na | | |
| 1600 | 1700 | | Canada, CKZN St John's NF | 6160na | | |
| 1600 | 1700 | | Canada, CKZU Vancouver BC | 6160na | | |
| 1600 | 1700 | | Canada, R Canada International | | | 9515as |
| 1600 | 1700 | DRM | Canada, R Canada International | | | 9800na |
| 1600 | 1700 | | China, China Radio International | | | 6095af |
| | | | 6180as | 7235as | 7420af | 9570af |
| | | | 9720af | 9760as | 11650eu | 11900af |
| | | | 11940eu | 11965eu | 13760eu | |
| 1600 | 1700 | | Egypt, Radio Cairo | 12170af | | |
| 1600 | 1700 | | Ethiopia, Radio Ethiopia | 7165af | | 9560af |
| 1600 | 1700 | | France, Radio France International | | | 15605af |
| | | | 17605af | | | |
| 1600 | 1700 | | Germany, CVC Intl-Christian Vision | | | 17770af |
| 1600 | 1700 | | Germany, Deutsche Welle | 9485as | | 9540as |
| | | | 15640as | | | |
| 1600 | 1700 | DRM | Germany, Deutsche Welle | 11810eu | | |
| 1600 | 1700 | | Italy, NEXUS/IRRS | 15650af | | |
| 1600 | 1700 | | Malaysia, RTM/Traxx FM | 7295as | | |
| 1600 | 1700 | | Netherlands, R Netherlands Worldwide | | | 13570af |
| 1600 | 1700 | DRM | New Zealand, Radio NZ International | | | 6170pa |
| 1600 | 1700 | | New Zealand, Radio NZ International | | | 7285pa |
| 1600 | 1700 | | Nigeria, Radio Nigeria/Kaduna | | | 4770do |
| 1600 | 1700 | | Palau, T8WH/World Harvest | 9905as | | 9965as |
| 1600 | 1700 | vl | Papua New Guinea, Wantok R. Light | | | 7325do |
| 1600 | 1700 | | Russia, Voice of Russia | 4975me | | 11985va |
| | | | 12040af | 13855af | | |
| 1600 | 1700 | vl | Rwanda, Radio Rwanda | 6055do | | |
| 1600 | 1700 | vl | Solomon Islands, SIBC | 5020do | | 9545al |
| 1600 | 1700 | | South Korea, KBS World Radio | | | 9515eu |
| 1600 | 1700 | | Taiwan, R Taiwan International | | | 13840as |
| 1600 | 1700 | | Uganda, Dunamis Shortwave | 4750af | | |
| 1600 | 1700 | | UK, BBC World Service | 3255af | | 5790eu |
| | | | 5975as | 6190af | 7385af | 9625as |
| | | | 11920as | 12095eu | 15400af | 17640af |
| | | | 17795af | 17830af | 21470af | |
| 1600 | 1700 | DRM | UK, BBC World Service | 5790eu | | 11810eu |
| 1600 | 1700 | Sat | UK, BBC World Service | 7385af | | 15420af |
| 1600 | 1700 | Sun | UK, Bible Voice Broadcasting | 13590me | | |
| 1600 | 1700 | | USA, American Forces Network | | | 4319usb |
| | | | 5446usb | 5765usb | 6350usb | 7811usb |
| | | | 10320usb | 12133usb | 13362usb | |
| 1600 | 1700 | | USA, EWTN Vandiver AL | 15610eu | | |
| 1600 | 1700 | | USA, Voice of America | 4930af | | 6080af |
| | | | 9885af | 12080va | 13570va | 15580af |
| | | | 17715af | 17895va | | |
| 1600 | 1700 | | USA, WBCQ Monticello ME | 5110am | | 7415am |
| | | | 9330am | 15420am | 17495am | |
| 1600 | 1700 | | USA, WBOH Newport NC | 5920am | | |
| 1600 | 1700 | | USA, WHRA Greenbush ME | 17520af | | |
| 1600 | 1700 | | USA, WHRI Cypress Creek SC | | | 9495va |
| | | | 9840na | 15195na | | |
| 1600 | 1700 | | USA, WINB Red Lion PA | 13570ca | | |
| 1600 | 1700 | | USA, WRMI Miami FL | 9955na | | |
| 1600 | 1700 | | USA, WTJC Newport NC | 9370na | | |
| 1600 | 1700 | | USA, WWCR Nashville TN | 9980na | | 12160na |
| | | | 13845na | 15825na | | |
| 1600 | 1700 | | USA, WWRB Manchester TN | 9385va | | |
| 1600 | 1700 | | USA, WYFR/Family Radio Worldwide | | | 6085sa |
| | | | 13695as | 17795na | 18980af | 21455eu |
| | | | 21525af | | | |
| 1600 | 1700 | vl | Zambia CVC/ The Voice Africa | | | 4965af |
| | | | 13590af | | | |
| 1615 | 1630 | | Vatican City, Vatican Radio | 4005eu | | 5885eu |
| | | | 7250eu | 9645eu | 15595me | |
| 1615 | 1700 | Sun | UK, BBC World Service | 7385af | | 11860af |
| | | | 15420af | | | |
| 1615 | 1700 | | UK, Bible Voice Broadcasting | 13590me | | |
| 1630 | 1645 | | UK, Bible Voice Broadcasting | 13590me | | |
| 1630 | 1657 | | Slovakia, R Slovakia International | | | 5920eu |
| | | | 6055eu | | | |
| 1630 | 1700 | | Guam, KSDA/ AWR | 6190as | | |
| 1630 | 1700 | | Nigeria, Voice of Nigeria/Lagos | | | 15120af |
| 1630 | 1700 | mtwhf | UK, BBC World Service | 15420af | | |
| 1630 | 1700 | Sat | UK, BBC World Service | 11860af | | |
| 1640 | 1650 | mtwhfa | Turkmenistan, Turkmen Radio | 4930eu | | |
| 1645 | 1700 | vl/ mtwhf | Moldova, Radio PMR/Pridnestrovie | | | 7370eu |
| 1645 | 1700 | | Tajikistan, Tajik Radio | 7245as | | |

## 1700 UTC - 1PM EDT / 12PM CDT / 10AM PDT

| | | | | | | |
|---|---|---|---|---|---|---|
| 1700 | 1705 | DRM | Canada, R Canada International | | | 9800na |
| 1700 | 1715 | t/ vl | UK, Bible Voice Broadcasting | 13590me | | |
| 1700 | 1727 | | Czech Rep, Radio Prague | 5930eu | | 17485eu |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1700 | 1728 | | Vietnam, Voice of Vietnam | 9725pa | | | |
| 1700 | 1730 | | Australia, CVC International | 9680as | | | |
| 1700 | 1730 | | UK, Bible Voice Broadcasting | 13590me | | | |
| 1700 | 1730 | | USA, Voice of America | 6080af | 9885af | | |
| | | | 11835af | 15580af | | | |
| 1700 | 1730 | Sat | USA, WRMI Miami FL | 9955am | | | |
| 1700 | 1746 | | UK, BBC World Service | 6005af | 9410af | | |
| 1700 | 1750 | | New Zealand, Radio NZ International | 7285pa | | | |
| 1700 | 1750 | DRM | New Zealand, Radio NZ International | 6170pa | | | |
| 1700 | 1756 | | Romania, R Romania International | 9535eu | | | |
| | | | 11735eu | | | | |
| 1700 | 1759 | Sat | Canada, R Canada International | 5850eu | | | |
| 1700 | 1759 | | Poland, Polish Radio | 9790eu | | | |
| 1700 | 1759 | DRM | Poland, Polish Radio | 7265eu | | | |
| 1700 | 1800 | | Anguilla, Worldwide Univ Network | 11775am | | | |
| 1700 | 1800 | | Australia, Radio Australia | 5995va | 6080va | | |
| | | | 9475as | 9580va | 9710as | 11880as | |
| 1700 | 1800 | Sat | Canada, CBC NQ SW Service | 9625na | | | |
| 1700 | 1800 | | Canada, CFRX Toronto ON | 6070na | | | |
| 1700 | 1800 | | Canada, CFVP Calgary AB | 6030na | | | |
| 1700 | 1800 | | Canada, CKZN St John's NF | 6160na | | | |
| 1700 | 1800 | | Canada, CKZU Vancouver BC | 6160na | | | |
| 1700 | 1800 | | Canada, R Canada International | 9515as | | | |
| 1700 | 1800 | | China, China Radio International | 6060as | | | |
| | | | 6090as | 6140as | 6145eu | 6165as | |
| | | | 7235as | 7265as | 7315va | 7335eu | |
| | | | 7410as | 7420as | 9570af | 9695eu | |
| | | | 11900af | 11940eu | 13760eu | | |
| 1700 | 1800 | | Egypt, Radio Cairo | 12170af | | | |
| 1700 | 1800 | | Equatorial Guinea, Radio Africa | 15190af | | | |
| 1700 | 1800 | | Germany, CVC Intl-Christian Vision | 17770af | | | |
| 1700 | 1800 | DRM | Germany, Deutsche Welle | 5790eu | 9960eu | | |
| 1700 | 1800 | | Italy, NEXUS/IRRS | 15650af | | | |
| 1700 | 1800 | | Malaysia, RTM/Traxx FM | 7295as | | | |
| 1700 | 1800 | | Nigeria, Radio Nigeria/Kaduna | 4770do | | | |
| 1700 | 1800 | | Nigeria, Voice of Nigeria/Lagos | 15120af | | | |
| 1700 | 1800 | | Palau, T8WH/World Harvest | 9905as | 9965as | | |
| 1700 | 1800 | vl | Papua New Guinea, Wantok R. Light | 7325do | | | |
| 1700 | 1800 | | Russia, Voice of Russia | 4975me | 11610me | | |
| | | | 11985af | 12040af | 12070af | 13855af | |
| 1700 | 1800 | vl | Rwanda, Radio Rwanda | 6055do | | | |
| 1700 | 1800 | vl | Solomon Islands, SIBC | 5020eu | 9545al | | |
| 1700 | 1800 | | South Africa, Channel Africa | 15235af | | | |
| 1700 | 1800 | | Taiwan, R Taiwan International | 15690af | | | |
| 1700 | 1800 | | Uganda, Dunamis Shortwave | 4750af | | | |
| 1700 | 1800 | vl | Uganda, UBC Radio | 4976do | | | |
| 1700 | 1800 | | UK, BBC World Service | 3255af | 5790eu | | |
| | | | 5875eu | 5975as | 6190af | 7400as | |
| | | | 7405af | 9625as | 9960eu | 12095af | |
| | | | 13675eu | 15400af | 17795af | 17830af | |
| 1700 | 1800 | Sat | UK, Bible Voice Broadcasting | 9430me | | | |
| 1700 | 1800 | Sun | UK, Bible Voice Broadcasting | 13590me | | | |
| 1700 | 1800 | | USA, American Forces Network | 4319usb | | | |
| | | | 5446usb | 5765usb | 6350usb | 7811usb | |
| | | | 10320usb | 12133usb | 13362usb | | |
| 1700 | 1800 | | USA, EWTN Vandiver AL | 15610na | | | |
| 1700 | 1800 | | USA, Voice of America | 15675af | | | |
| 1700 | 1800 | | USA, WBCQ Monticello ME | 5110am | 7415am | | |
| | | | 9330am | 15420am | 17495am | | |
| 1700 | 1800 | | USA, WBOH Newport NC | 5920am | | | |
| 1700 | 1800 | | USA, WHRA Greenbush ME | 17520af | | | |
| 1700 | 1800 | | USA, WHRI Cypress Creek SC | 11785na | | | |
| 1700 | 1800 | smtwhf | USA, WHRI Cypress Creek SC | 9840na | | | |
| | | | 17520na | | | | |
| 1700 | 1800 | Sat | USA, WHRI Cypress Creek SC | 9495na | | | |
| | | | 17520na | | | | |
| 1700 | 1800 | | USA, WINB Red Lion PA | 13570ca | | | |
| 1700 | 1800 | | USA, WRMI Miami FL | 9955am | | | |
| 1700 | 1800 | | USA, WTJC Newport NC | 9370na | | | |
| 1700 | 1800 | | USA, WWCR Nashville TN | 9980na | 12160na | | |
| | | | 13845na | 15825na | | | |
| 1700 | 1800 | | USA, WWRB Manchester TN | 9385va | | | |
| 1700 | 1800 | | USA, WYFR/Family Radio Worldwide | 13690na | | | |
| | | | 17795na | 18980af | 21455eu | | |
| 1700 | 1800 | vl | Zambia CVC/ The Voice Africa | 4965af | | | |
| | | | 13590af | | | | |
| 1720 | 1740 | fas | USA, Voice of America | 4930af | 12080af | | |
| | | | 15775af | | | | |
| 1730 | 1800 | | Bulgaria, Radio Bulgaria | 5900eu | 7400eu | | |
| 1730 | 1800 | DRM | Bulgaria, Radio Bulgaria | 9400eu | | | |
| 1730 | 1800 | | UK, Bible Voice Broadcasting | 13590me | | | |
| 1730 | 1800 | Sun | UK, Bible Voice Broadcasting | 9430me | | | |
| 1730 | 1800 | mtwhf | UK, Sudan Radio Service | 9840af | | | |
| 1730 | 1800 | | USA, Voice of America | 6080af | 9885af | | |
| | | | 15410af | 15580af | | | |
| 1730 | 1800 | | Vatican City, Vatican Radio | 11625af | 13765af | | |
| | | | 15570af | | | | |
| 1745 | 1800 | | Bangladesh, Bangla Betar | 7250as | | | |
| 1745 | 1800 | DRM | India, All India Radio | 9950eu | | | |
| 1745 | 1800 | | India, All India Radio | 7410eu | 9445af | | |
| | | | 11620eu | 11935af | 13605as | 15155af | |
| | | | 17670af | | | | |
| 1745 | 1800 | | UK, Bible Voice Broadcasting | 13590me | | | |
| 1751 | 1800 | DRM | New Zealand, Radio NZ International | 7285pa | | | |
| 1751 | 1800 | | New Zealand, Radio NZ International | 6170pa | | | |

## 1800 UTC - 2PM EDT / 1PM CDT / 11AM PDT

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1800 | 1815 | Sat | UK, Bible Voice Broadcasting | 11970as | | | |
| 1800 | 1815 | Sun | UK, Bible Voice Broadcasting | 13590me | | | |
| 1800 | 1830 | | China, China Radio International | 6020eu | | | |
| | | | 7265eu | | | | |
| 1800 | 1830 | | Nigeria, Radio, National Svc/Abuja | 7275do | | | |
| 1800 | 1830 | | South Africa, AWR Africa | 3215af | 3345af | | |
| | | | 9610af | | | | |
| 1800 | 1830 | | UK, BBC World Service | 5975as | 6015as | | |
| | | | 9625as | | | | |
| 1800 | 1830 | | UK, Bible Voice Broadcasting | 13590me | | | |
| 1800 | 1830 | Sat | UK, Bible Voice Broadcasting | 9430me | | | |
| 1800 | 1830 | f | USA, Voice of America | 4930af | 12080af | | |
| | | | 15775af | | | | |
| 1800 | 1830 | Sat/Sun | USA, Voice of America | 4930af | 12080af | | |
| | | | 15775af | | | | |
| 1800 | 1845 | Sun | UK, Bible Voice Broadcasting | 9430me | | | |
| 1800 | 1845 | Sat | UK, Bible Voice Broadcasting | 6130va | | | |
| 1800 | 1850 | | New Zealand, Radio NZ International | 6170pa | | | |
| 1800 | 1850 | DRM | New Zealand, Radio NZ International | 7285pa | | | |
| 1800 | 1857 | | Netherlands, R Netherlands Worldwide | 6020af | | | |
| | | | 15535af | | | | |
| 1800 | 1857 | | North Korea, Voice of Korea | 13760eu | 15245eu | | |
| 1800 | 1859 | | Canada, R Canada International | 9515af | | | |
| | | | 17735af | 17810af | | | |
| 1800 | 1900 | | Anguilla, Worldwide Univ Network | 11775am | | | |
| 1800 | 1900 | mtwhf | Argentina, Radio Nacional RAE | 9690eu | | | |
| | | | 15345eu | | | | |
| 1800 | 1900 | | Australia, Radio Australia | 6080va | 7240as | | |
| | | | 9475va | 9580as | 9710as | 11880as | |
| 1800 | 1900 | | Bangladesh, Bangla Betar | 7250eu | | | |
| 1800 | 1900 | | Canada, CFRX Toronto ON | 6070na | | | |
| 1800 | 1900 | | Canada, CFVP Calgary AB | 6030na | | | |
| 1800 | 1900 | | Canada, CKZN St John's NF | 6160na | | | |
| 1800 | 1900 | | Canada, CKZU Vancouver BC | 6160na | | | |
| 1800 | 1900 | | China, China Radio International | 6030eu | | | |
| | | | 9600eu | 13760eu | | | |
| 1800 | 1900 | | Equatorial Guinea, Radio Africa | 15190af | | | |
| 1800 | 1900 | | Germany, CVC Intl-Christian Vision | 17770af | | | |
| 1800 | 1900 | DRM | Germany, Deutsche Welle | 5790eu | 9960eu | | |
| 1800 | 1900 | DRM | India, All India Radio | 9950eu | | | |
| 1800 | 1900 | | India, All India Radio | 7410eu | 9445af | | |
| | | | 11620eu | 11935af | 13605as | 15155af | |
| | | | 17670af | | | | |
| 1800 | 1900 | fas | Italy, NEXUS/IRRS | 7290va | | | |
| 1800 | 1900 | | Kuwait, Radio Kuwait | 11990va | | | |
| 1800 | 1900 | | Malaysia, RTM/Traxx FM | 7295as | | | |
| 1800 | 1900 | | Nigeria, Radio Nigeria/Kaduna | 4770do | | | |
| 1800 | 1900 | | Nigeria, Voice of Nigeria/Lagos | 15120af | | | |
| 1800 | 1900 | | Palau, T8WH/World Harvest | 9905as | 9965as | | |
| 1800 | 1900 | vl | Papua New Guinea, Wantok R. Light | 7325do | | | |
| 1800 | 1900 | | Russia, Voice of Russia | 4975me | 12040af | | |
| | | | 12070af | | | | |
| 1800 | 1900 | vl | Rwanda, Radio Rwanda | 6055do | | | |
| 1800 | 1900 | vl | Solomon Islands, SIBC | 5020do | 9545al | | |
| 1800 | 1900 | | South Korea, KBS World Radio | 7275eu | | | |
| 1800 | 1900 | | Taiwan, R Taiwan International | 6155eu | | | |
| 1800 | 1900 | vl | Uganda, Dunamis Shortwave | 4750af | | | |
| 1800 | 1900 | vl | Uganda, UBC Radio | 4976do | | | |
| 1800 | 1900 | | UK, BBC World Service | 3255af | 5790eu | | |
| | | | 5875eu | 5995as | 6190af | 7405af | |
| | | | 9485as | 9660eu | 11810af | 12095af | |
| | | | 13675eu | 15400af | 17795af | | |
| 1800 | 1900 | Sun | UK, Bible Voice Broadcasting | 6130va | | | |
| 1800 | 1900 | | USA, American Forces Network | 4319usb | | | |
| | | | 5446usb | 5765usb | 6350usb | 7811usb | |
| | | | 10320usb | 12133usb | 13362usb | | |
| 1800 | 1900 | | USA, EWTN Vandiver AL | 15610na | | | |
| 1800 | 1900 | | USA, Voice of America | 4930af | 6080af | | |
| | | | 9885af | 11975af | 15410af | 15580af | |
| 1800 | 1900 | | USA, WBCQ Monticello ME | 5110am | 7415am | | |
| | | | 9330am | 15420am | 17495am | | |
| 1800 | 1900 | | USA, WBOH Newport NC | 5920am | | | |
| 1800 | 1900 | mtwhf | USA, WHRA Greenbush ME | 15665va | | | |
| 1800 | 1900 | Sat/Sun | USA, WHRA Greenbush ME | 17690af | | | |
| 1800 | 1900 | mtwhfa | USA, WHRA Greenbush ME | 15665va | | | |
| 1800 | 1900 | mtwhf | USA, WHRI Cypress Creek SC | 17520af | | | |
| 1800 | 1900 | Sat/Sun | USA, WHRI Cypress Creek SC | 9495va | | | |
| 1800 | 1900 | | USA, WHRI Cypress Creek SC | 9840na | | | |
| | | | 11785na | | | | |
| 1800 | 1900 | | USA, WINB Red Lion PA | 13570ca | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 1800 | 1900 | | USA, WRMI Miami FL | 9955am | | |
| 1800 | 1900 | | USA, WTJC Newport NC | 9370na | | |
| 1800 | 1900 | | USA, WWCR Nashville TN | 9980na | 12160na | |
| | | | 13845na | 15825na | | |
| 1800 | 1900 | | USA, WWRB Manchester TN | 9385va | | |
| 1800 | 1900 | | USA, WYFR/Family Radio Worldwide | | 6180af | |
| | | | 9465af | 9770af | 11875af | 13830af |
| | | | 17845af | 18930af | 18980af | |
| 1800 | 1900 | | Yemen, Rep of Yemen Radio | 9780me | | |
| 1800 | 1900 | vl | Zambia CVC/ The Voice Africa | | 4965af | |
| | | | 13590af | | | |
| 1805 | 1810 | Sat | Croatia, Voice of Croatia | 6165eu | | |
| 1805 | 1815 | mtwhf | Croatia, Voice of Croatia | 6165eu | | |
| 1830 | 1857 | | Slovakia, R Slovakia International | | 5920eu | |
| | | | 6055eu | | | |
| 1830 | 1858 | | Serbia, International Radio of Serbia | | 6100eu | |
| 1830 | 1900 | | Turkey, Voice of Turkey | 9785eu | | |
| 1830 | 1900 | | UK, BBC World Service | 6005af | 9410af | |
| 1830 | 1900 | f | UK, Bible Voice Broadcasting | 9430me | | |
| 1845 | 1900 | mtwhfa | Albania, Radio Tirana | 7430eu | 13640na | |
| 1845 | 1900 | | UK, Bible Voice Broadcasting | 11830af | | |
| 1851 | 1900 | DRM | New Zealand, Radio NZ International | | 9890pa | |

## 1900 UTC - 3PM EDT / 2PM CDT / 12PM PDT

| | | | | | | |
|---|---|---|---|---|---|---|
| 1900 | 1905 | | Canada, R Canada International | | 9515af | |
| 1900 | 1925 | | Turkey, Voice of Turkey | 9785eu | | |
| 1900 | 1928 | | Vietnam, Voice of Vietnam | 7280va | 9730va | |
| 1900 | 1930 | | Germany, Deutsche Welle | 6150af | 11795af | |
| | | | 15620af | 17860af | | |
| 1900 | 1935 | DRM | New Zealand, Radio NZ International | | 9890pa | |
| 1900 | 1945 | | India, All India Radio | 7410eu | 9445af | |
| | | | 11620eu | 11935af | 13605as | 15155af |
| | | | 17670af | | | |
| 1900 | 1945 | DRM | India, All India Radio | 9950eu | | |
| 1900 | 1945 | | USA, WYFR/Family Radio Worldwide | | 6085sa | |
| 1900 | 1950 | | New Zealand, Radio NZ International | | 9615pa | |
| 1900 | 1957 | | Netherlands, R Netherlands Worldwide | | 5905af | |
| | | | 7425af | 9480af | 11660af | 15335af |
| | | | 15535af | | | |
| 1900 | 1957 | | North Korea, Voice of Korea | 7100af | 9975va | |
| | | | 11910af | 11535va | | |
| 1900 | 2000 | | Anguilla, Worldwide Univ Network | | 11775am | |
| 1900 | 2000 | | Australia, Radio Australia | 6080va | 7240as | |
| | | | 9500va | 9580va | 9710as | 11880as |
| 1900 | 2000 | | Canada, CFRX Toronto ON | 6070na | | |
| 1900 | 2000 | | Canada, CFVP Calgary AB | 6030na | | |
| 1900 | 2000 | | Canada, CKZN St John's NF | 6160na | | |
| 1900 | 2000 | | Canada, CKZU Vancouver BC | 6160na | | |
| 1900 | 2000 | | China, China Radio International | | 7285eu | |
| | | | 7295va | 9435va | 9440va | |
| 1900 | 2000 | | Egypt, Radio Cairo | 11510af | | |
| 1900 | 2000 | | Equatorial Guinea, Radio Africa | | 15190af | |
| 1900 | 2000 | | Germany, CVC Intl-Christian Vision | | 17770af | |
| 1900 | 2000 | DRM | Germany, Deutsche Welle | 3995eu | 5875eu | |
| 1900 | 2000 | | Germany, Overcomer Ministries | | 6175eu | |
| 1900 | 2000 | fas | Italy, NEXUS/IRRS 7290va | | | |
| 1900 | 2000 | | Kuwait, Radio Kuwait | 11990va | | |
| 1900 | 2000 | | Malaysia, RTM/Traxx FM | 7295as | | |
| 1900 | 2000 | | Nigeria, Radio Nigeria/Kaduna | | 4770do | |
| 1900 | 2000 | | Nigeria, Voice of Nigeria/Lagos | | 15120af | |
| 1900 | 2000 | | Palau, T8WH/World Harvest | 9905as | 9965as | |
| 1900 | 2000 | vl | Papua New Guinea, Wantok R. Light | | 7325do | |
| 1900 | 2000 | | Russia, Voice of Russia | 12040af | 12070af | |
| 1900 | 2000 | vl | Rwanda, Radio Rwanda | 6055do | | |
| 1900 | 2000 | vl | Solomon Islands, SIBC | 5020do | | |
| 1900 | 2000 | mtwhf | Spain, Radio Exterior Espana | 9665eu | 11620af | |
| 1900 | 2000 | | Swaziland, TWR 3200af | | | |
| 1900 | 2000 | | Thailand, Radio Thailand World Svc | | 7570eu | |
| 1900 | 2000 | vl | Uganda, UBC Radio | 4976do | | |
| 1900 | 2000 | | UK, BBC World Service | 3255af | 3995eu | |
| | | | 5875eu | 5995as | 6005af | 6155as |
| | | | 6190af | 9410af | 11810af | 12095af |
| | | | 15400af | 17795af | | |
| 1900 | 2000 | | UK, Bible Voice Broadcasting | 11830af | | |
| 1900 | 2000 | | Ukraine, R Ukraine International | | 7490eu | |
| 1900 | 2000 | | USA, American Forces Network | | 4319usb | |
| | | | 5446usb | 5765usb | 6350usb | 7811usb |
| | | | 10320usb | 12133usb | 13362usb | |
| 1900 | 2000 | | USA, EWTN Vandiver AL | 15610na | | |
| 1900 | 2000 | | USA, KJES Vado NM | 11715na | | |
| 1900 | 2000 | | USA, Voice of America | 4930af | 4940af | |
| | | | 5990af | 6080af | 7480va | 9780va |
| | | | 9885af | 15580af | 17895af | |
| 1900 | 2000 | | USA, WBCQ Monticello ME | 5110am | 7415am | |
| | | | 9330am | 15420am | 17495am | |
| 1900 | 2000 | | USA, WBOH Newport NC | 5920am | | |
| 1900 | 2000 | mtwhfa | USA, WHRA Greenbush ME | 15665va | | |
| 1900 | 2000 | Sat/Sun | USA, WHRA Greenbush ME | 17690af | | |
| 1900 | 2000 | | USA, WHRI Cypress Creek SC | | 9495va | |
| | | | 9840na | 11785na | | |
| 1900 | 2000 | mtwhfa | USA, WHRI Cypress Creek SC | | 15665na | |
| 1900 | 2000 | Sun | USA, WHRI Cypress Creek SC | | 17690na | |
| 1900 | 2000 | | USA, WINB Red Lion PA | 13570ca | | |
| 1900 | 2000 | | USA, WRMI Miami FL | 9955am | | |
| 1900 | 2000 | | USA, WTJC Newport NC | 9370na | | |
| 1900 | 2000 | | USA, WWCR Nashville TN | 9980na | 12160na | |
| | | | 13845na | 15845na | | |
| 1900 | 2000 | | USA, WWRB Manchester TN | 9385va | | |
| 1900 | 2000 | | USA, WYFR/Family Radio Worldwide | | 3230af | |
| | | | 13615am | 13690af | 17795na | 17845af |
| | | | 18930eu | 18980eu | | |
| 1900 | 2000 | vl | Zambia CVC/ The Voice Africa | | 4965af | |
| | | | 5940af | | | |
| 1905 | 2000 | Mon | South Africa, SA Radio League | | 3215af | |
| 1930 | 2000 | | Iran, VOIRI/ IRIB | 5945eu | 6205eu | 7205eu |
| | | | 9800af | 9925af | | |
| 1930 | 2000 | | South Africa, RTE 6220af | | | |
| 1936 | 1950 | DRM | New Zealand, Radio NZ International | | 9890pa | |
| 1945 | 2000 | mtwhf | UK, Bible Voice Broadcasting | 11830af | | |
| 1945 | 2000 | DRM | Vatican City, Vatican Radio | 9800na | | |
| 1950 | 2000 | | New Zealand, Radio NZ International | | 11725pa | |
| 1951 | 2000 | DRM | New Zealand, Radio NZ International | | 9890pa | |

## 2000 UTC - 4PM EDT / 3PM CDT / 1PM PDT

| | | | | | | |
|---|---|---|---|---|---|---|
| 2000 | 2005 | Mon | South Africa, SA Radio League | | 3215af | |
| 2000 | 2015 | mtwhf | UK, Bible Voice Broadcasting | 11830af | | |
| 2000 | 2027 | | Czech Rep, Radio Prague | 5930eu | 11600na | |
| 2000 | 2030 | mtwhfa | Albania, Radio Tirana | 7465eu | 13640na | |
| 2000 | 2030 | | Egypt, Radio Cairo | 11510af | | |
| 2000 | 2030 | | Iran, VOIRI/ IRIB | 5945eu | 6205eu | 7205eu |
| | | | 9800af | 9925af | | |
| 2000 | 2030 | | South Africa, RTE 6220af | | | |
| 2000 | 2030 | | USA, Voice of America | 4930af | 4940af | |
| | | | 6080af | 9885af | 15580af | 17895af |
| 2000 | 2030 | | Vatican City, Vatican Radio | 7365af | 9755af | |
| | | | 11625af | | | |
| 2000 | 2030 | DRM | Vatican City, Vatican Radio | 9800na | | |
| 2000 | 2045 | | USA, WYFR/Family Radio Worldwide | | 17750sa | |
| 2000 | 2050 | | New Zealand, Radio NZ International | | 11725pa | |
| 2000 | 2050 | DRM | New Zealand, Radio NZ International | | 9890pa | |
| 2000 | 2057 | | Netherlands, R Netherlands Worldwide | | 5905af | |
| | | | 7425af | 11610af | | |
| 2000 | 2100 | | Anguilla, Worldwide Univ Network | | 11775am | |
| 2000 | 2100 | | Australia, ABC NT Alice Springs | | 2310do | |
| | | | 4835do | | | |
| 2000 | 2100 | | Australia, ABC NT Katherine | 2485do | | |
| 2000 | 2100 | | Australia, ABC NT Tennant Creek | | 2325do | |
| 2000 | 2100 | Sat/Sun | Australia, Radio Australia | 6080va | 7240va | |
| | | | 12080as | | | |
| 2000 | 2100 | | Australia, Radio Australia | 9500va | 11650as | |
| | | | 11660pa | 11880as | | |
| 2000 | 2100 | | Canada, CFRX Toronto ON | 6070na | | |
| 2000 | 2100 | | Canada, CFVP Calgary AB | 6030na | | |
| 2000 | 2100 | | Canada, CKZN St John's NF | 6160na | | |
| 2000 | 2100 | | Canada, CKZU Vancouver BC | 6160na | | |
| 2000 | 2100 | | Canada, R Canada International | | 15235af | |
| 2000 | 2100 | | China, China Radio International | | 5960eu | |
| | | | 5985af | 7275va | 7285eu | 7415eu |
| | | | 9600eu | 11640af | 13630af | |
| 2000 | 2100 | | Equatorial Guinea, Radio Africa | | 15190af | |
| 2000 | 2100 | | Germany, CVC Intl-Christian Vision | | 17770af | |
| 2000 | 2100 | | Germany, Deutsche Welle | 6150af | 11795af | |
| | | | 11865af | 15205af | | |
| 2000 | 2100 | | Kuwait, Radio Kuwait | 11990va | | |
| 2000 | 2100 | vl | Liberia, ELWA 4760do | 6070al | | |
| 2000 | 2100 | | Malaysia, RTM/Traxx FM | 7295as | | |
| 2000 | 2100 | | Nigeria, Radio Nigeria/Kaduna | | 4770do | |
| 2000 | 2100 | | Nigeria, Voice of Nigeria/Lagos | | 15120af | |
| 2000 | 2100 | | Palau, T8WH/World Harvest | 9905as | 9965as | |
| 2000 | 2100 | vl | Papua New Guinea, R East New Britain | | 3385do | |
| 2000 | 2100 | vl | Papua New Guinea, Wantok R. Light | | 7325do | |
| 2000 | 2100 | | Russia, Voice of Russia | 12040af | 12070af | |
| 2000 | 2100 | vl | Rwanda, Radio Rwanda | 6055do | | |
| 2000 | 2100 | | Swaziland, TWR 3200af | 9500af | | |
| 2000 | 2100 | vl | Uganda, UBC Radio | 4976do | | |
| 2000 | 2100 | | UK, BBC World Service | 3255af | 3995eu | |
| | | | 5875eu | 6005af | 6190af | 9410af |
| | | | 11810af | 12095af | 13820af | 15400af |
| 2000 | 2100 | DRM | UK, BBC World Service | 3995eu | 5875eu | |
| 2000 | 2100 | | USA, American Forces Network | | 4319usb | |
| | | | 5446usb | 5765usb | 6350usb | 7811usb |
| | | | 10320usb | 12133usb | 13362usb | |
| 2000 | 2100 | | USA, EWTN Vandiver AL | 15610va | | |
| 2000 | 2100 | | USA, WBCQ Monticello ME | 5110am | 7415am | |
| | | | 9330am | 15420am | 17495am | |
| 2000 | 2100 | | USA, WBOH Newport NC | 5920am | | |

SHORTWAVE GUIDE

| | | | | | | |
|---|---|---|---|---|---|---|
| 2000 | 2100 | mtwhfa | USA, WHRA Greenbush ME | 7520eu | | |
| 2000 | 2100 | | USA, WHRI Cypress Creek SC 15665na | | | 9495va |
| 2000 | 2100 | f | USA, WHRI Cypress Creek SC | | | 17650af |
| 2000 | 2100 | Sat/Sun | USA, WHRI Cypress Creek SC | | | 9495va |
| 2000 | 2100 | | USA, WINB Red Lion PA | 13570ca | | |
| 2000 | 2100 | | USA, WRMI Miami FL | 9955am | | |
| 2000 | 2100 | | USA, WTJC Newport NC | 9370na | | |
| 2000 | 2100 | | USA, WWCR Nashville TN 13845na | 9980na | 15825na | 12160na |
| 2000 | 2100 | | USA, WWRB Manchester TN | 9385va | | |
| 2000 | 2100 | | USA, WYFR/Family Radio Worldwide 17725sa | | 17795na | 13615am 17845af 18980eu |
| 2000 | 2100 | vl | Zambia CVC/ The Voice Africa 5940af | | | 4965af |
| 2030 | 2045 | | Thailand, Radio Thailand World Svc | | | 9680eu |
| 2030 | 2056 | | Romania, R Romania International 9765eu | | 11810eu | 9690na 11940af |
| 2030 | 2058 | | Vietnam, Voice of Vietnam 9550va | | 9730va | 7220va 7280va |
| 2030 | 2100 | | Cuba, Radio Havana Cuba | 17600va | | 17660va |
| 2030 | 2100 | | Sweden, Radio Sweden | 7395va | | |
| 2030 | 2100 | | Turkey, Voice of Turkey | 7205va | | |
| 2030 | 2100 | | USA, Voice of America 7555as | 4930af | 9885af | 6080af 15580af 17895af |
| 2045 | 2100 | | India, All India Radio 9910pa | 7410eu | 9950eu | 9445eu 11620va 11715pa |
| 2051 | 2100 | | New Zealand, Radio NZ International | | | 13730pa |
| 2051 | 2200 | DRM | New Zealand, Radio NZ International | | | 15720pa |

## 2100 UTC - 5PM EDT / 4PM CDT / 2PM PDT

| | | | | | | |
|---|---|---|---|---|---|---|
| 2100 | 2125 | | Turkey, Voice of Turkey | 7205va | | |
| 2100 | 2128 | | Serbia, International Radio of Serbia | | | 6100eu |
| 2100 | 2130 | | Australia, ABC NT Katherine | 2485do | | |
| 2100 | 2130 | | Australia, ABC NT Tennant Creek | | | 2325do |
| 2100 | 2130 | | Austria, AWR-Europe | 11955af | | |
| 2100 | 2130 | Sat | Canada, CBC NQ SW Service | 9625na | | |
| 2100 | 2130 | | China, China Radio International 7225eu | 7415eu | 9490eu | 6135eu 9600eu 11640af 13630af |
| 2100 | 2130 | | Cuba, Radio Havana Cuba | 17600va | | 17660va |
| 2100 | 2130 | | Nigeria, Radio, National Svc/Abuja | | | 7275do |
| 2100 | 2130 | | South Korea, KBS World Radio | | | 3955eu |
| 2100 | 2145 | | USA, WYFR/Family Radio Worldwide 13690na | | 17795na | 13615am 18980af |
| 2100 | 2157 | | North Korea, Voice of Korea | 13760eu | | 15245eu |
| 2100 | 2200 | | Angola, Radio Nacional de Angola | | | 7217do |
| 2100 | 2200 | | Anguilla, Worldwide Univ Network | | | 11775am |
| 2100 | 2200 | | Australia, ABC NT Alice Springs 4835do | | | 2310do |
| 2100 | 2200 | | Australia, Radio Australia 11650pa | 9500as | 11660pa | 9660as 11695as 12080as 13630as 15515as |
| 2100 | 2200 | | Belarus, Radio Belarus Minsk 7390eu | 7210eu | | 7255eu |
| 2100 | 2200 | | Bulgaria, Radio Bulgaria | 5900eu | | 7400eu |
| 2100 | 2200 | | Canada, CFRX Toronto ON | 6070na | | |
| 2100 | 2200 | | Canada, CFVP Calgary AB | 6030na | | |
| 2100 | 2200 | | Canada, CKZN St John's NF | 6160na | | |
| 2100 | 2200 | | Canada, CKZU Vancouver BC | 6160na | | |
| 2100 | 2200 | DRM | Canada, R Canada International | | | 9800na |
| 2100 | 2200 | | China, China Radio International 7205af | | 7285eu | 5990eu 7325af |
| 2100 | 2200 | | Equatorial Guinea, Radio Africa | | | 15190af |
| 2100 | 2200 | | Germany, Deutsche Welle 15205af | 9735af | | 11865af |
| 2100 | 2200 | DRM | Germany, Deutsche Welle | 3995af | | |
| 2100 | 2200 | | Guyana, Voice of Guyana | 3291do | | |
| 2100 | 2200 | | India, All India Radio 9910pa | 7410eu | 9950eu | 9445eu 11620va 11715pa |
| 2100 | 2200 | vl | Liberia, ELWA | 4760do | 6070al | |
| 2100 | 2200 | | Malaysia, RTM/Traxx FM | 7295as | | |
| 2100 | 2200 | | New Zealand, Radio NZ International | | | 13730pa |
| 2100 | 2200 | | Nigeria, Radio Nigeria/Kaduna | | | 4770do |
| 2100 | 2200 | | Nigeria, Voice of Nigeria/Lagos | | | 7255af |
| 2100 | 2200 | | Palau, T8WH/World Harvest | 9905as | | 9965as |
| 2100 | 2200 | vl | Papua New Guinea, Wantok R. Light | | | 7325do |
| 2100 | 2200 | | Russia, Voice of Russia | 12040af | | 12070af |
| 2100 | 2200 | Sat/Sun | Spain, Radio Exterior Espana | 9650eu | | |
| 2100 | 2200 | | Swaziland, TWR 3200af | | | |
| 2100 | 2200 | | Syria, Radio Damascus | 9330eu | | 12085as |
| 2100 | 2200 | | UK, BBC World Service 5790eu | 3255af | 5905as | 3915as 5965as 6005af 6190af 6195as 7410af 9915af 12095af |
| 2100 | 2200 | DRM | UK, BBC World Service | 3995eu | | 5790eu |
| 2100 | 2200 | | Ukraine, R Ukraine International | | | 7510eu |
| 2100 | 2200 | | USA, American Forces Network 5446usb | 5765usb | 6350usb | 4319usb 7811usb 10320usb 12133usb 13362usb |
| 2100 | 2200 | | USA, EWTN Vandiver AL | 15610va | | |
| 2100 | 2200 | | USA, Voice of America 15580af | 6080af | | 7555as |
| 2100 | 2200 | | USA, WBCQ Monticello ME 9330am | 5110am | 15420am | 7415am 17495am |
| 2100 | 2200 | | USA, WBOH Newport NC | 5920am | | |
| 2100 | 2200 | | USA, WHRI Cypress Creek SC 15665na | 11785na | | 7315na 11885na |
| 2100 | 2200 | Sat | USA, WHRI Cypress Creek SC | | | 9690na |
| 2100 | 2200 | | USA, WINB Red Lion PA | 9265ca | | |
| 2100 | 2200 | | USA, WRMI Miami FL | 9955am | | |
| 2100 | 2200 | | USA, WTJC Newport NC | 9370na | | |
| 2100 | 2200 | | USA, WWCR Nashville TN 12160na | 7465na | 13845na | 9980na |
| 2100 | 2200 | | USA, WWRB Manchester TN | 3215na | | |
| 2100 | 2200 | | USA, WYFR/Family Radio Worldwide | | | 17845na |
| 2100 | 2200 | vl | Zambia CVC/ The Voice Africa 5940af | | | 4965af |
| 2115 | 2200 | | Egypt, Radio Cairo | 6255eu | | |
| 2130 | 2157 | | Czech Rep, Radio Prague | 9410na | | 11600va |
| 2130 | 2200 | | Australia, ABC NT Katherine | 5025do | | |
| 2130 | 2200 | | Australia, ABC NT Tennant Creek | | | 4910do |
| 2130 | 2200 | mtwhfa | Canada, CBC NQ SW Service | 9625na | | |
| 2130 | 2200 | | China, China Radio International 7225eu | 7325eu | 7365eu | 6135eu 7415eu 9600eu |
| 2130 | 2200 | | Guam, KSDA/ AWR | 11850as | | |
| 2130 | 2200 | | Lithuania, Mighty KBC Radio | 6055eu | | |
| 2130 | 2200 | | Sweden, Radio Sweden | 7395va | | |

## 2200 UTC - 6PM EDT / 5PM CDT / 3PM PDT

| | | | | | | |
|---|---|---|---|---|---|---|
| 2200 | 2220 | | Japan, NHK World Radio Japan | | | 13640pa |
| 2200 | 2228 | | Lithuania, Mighty KBC Radio | 6055eu | | |
| 2200 | 2230 | | Australia, HCJB Global | 15525as | | |
| 2200 | 2230 | | India, All India Radio 9910pa | 7410eu | 9950eu | 9445eu 11620va 11715pa |
| 2200 | 2230 | | Swaziland, TWR 3200af | | | |
| 2200 | 2230 | | USA, WBCQ Monticello ME 9330am | 5110am | 15420am | 7415am |
| 2200 | 2235 | DRM | New Zealand, Radio NZ International | | | 15720pa |
| 2200 | 2235 | | New Zealand, Radio NZ International | | | 13730pa |
| 2200 | 2245 | | Egypt, Radio Cairo | 6255eu | | |
| 2200 | 2245 | | USA, WYFR/Family Radio Worldwide 17845va | | | 15770af |
| 2200 | 2255 | | Turkey, Voice of Turkey | 9830va | | |
| 2200 | 2256 | | Romania, R Romania International 9675eu | | 9790af | 7440eu 11940af |
| 2200 | 2300 | | Anguilla, Worldwide Univ Network | | | 6090am |
| 2200 | 2300 | | Australia, ABC NT Alice Springs 4835do | | | 2310do |
| 2200 | 2300 | | Australia, ABC NT Katherine | 5025do | | |
| 2200 | 2300 | | Australia, ABC NT Tennant Creek | | | 4910do |
| 2200 | 2300 | | Australia, Radio Australia 15230va | 12010va | 15240pa | 13630pa 15515as 15560pa 17795va |
| 2200 | 2300 | | Belarus, Radio Belarus Minsk 7390eu | 7210eu | | 7255eu |
| 2200 | 2300 | smtwhf | Canada, CBC NQ SW Service | 9625na | | |
| 2200 | 2300 | | Canada, CFRX Toronto ON | 6070na | | |
| 2200 | 2300 | | Canada, CFVP Calgary AB | 6030na | | |
| 2200 | 2300 | | Canada, CKZN St John's NF | 6160na | | |
| 2200 | 2300 | | Canada, CKZU Vancouver BC | 6160na | | |
| 2200 | 2300 | | China, China Radio International 7360eu | | 9590as | 7350eu |
| 2200 | 2300 | | Equatorial Guinea, Radio Africa | | | 15190af |
| 2200 | 2300 | | Guyana, Voice of Guyana | 3291do | | |
| 2200 | 2300 | vl | Liberia, ELWA | 4760do | 6070al | |
| 2200 | 2300 | | Malaysia, RTM/Traxx FM | 7295as | | |
| 2200 | 2300 | | Nigeria, Radio Nigeria/Kaduna | | | 4770do |
| 2200 | 2300 | | Nigeria, Voice of Nigeria/Lagos | | | 7255af |
| 2200 | 2300 | | Palau, T8WH/World Harvest | 9965as | | |
| 2200 | 2300 | vl | Papua New Guinea, Wantok R. Light | | | 7325do |
| 2200 | 2300 | | Russia, Voice of Russia 12070af | 9890na | | 12040af |
| 2200 | 2300 | | UK, BBC World Service 5965as 9740as | 3915as 6005af | 5905as 6195as | 9440as 9915af 12095af |
| 2200 | 2300 | | USA, American Forces Network 5446usb 10320usb | 5765usb 12133usb | 6350usb | 4319usb 7811usb 13362usb |
| 2200 | 2300 | | USA, EWTN Vandiver AL | 15610va | | |
| 2200 | 2300 | | USA, Voice of America 7460va 11955va | 5895va 7480va | | 5915va 7555as 9415va |
| 2200 | 2300 | | USA, WBCQ Monticello ME 9330am | 5110am | | 7415am |
| 2200 | 2300 | | USA, WBOH Newport NC | 5920am | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 2200 | 2300 | | USA, WHRI Cypress Creek SC | | | 7385va |
| | | | 9615na | 11785na | 11885na | |
| 2200 | 2300 | | USA, WINB Red Lion PA | | 9265ca | |
| 2200 | 2300 | | USA, WRMI Miami FL | | 9955am | |
| 2200 | 2300 | | USA, WTJC Newport NC | | 9370na | |
| 2200 | 2300 | | USA, WWCR Nashville TN | | 5070na | 7465na |
| | | | 9980na | 13845na | | |
| 2200 | 2300 | | USA, WWRB Manchester TN | | 3215na | 5050na |
| | | | 6890na | 9385va | | |
| 2200 | 2300 | | USA, WYFR/Family Radio Worldwide | | | 5950na |
| | | | 11740af | 15440na | | |
| 2200 | 2300 | vl | Zambia CVC/ The Voice Africa | | | 4965af |
| 2215 | 2300 | vl/ mtwhf | Moldova, Radio PMR/Pridnestrovie | | | 6240na |
| 2230 | 2257 | | Czech Rep, Radio Prague | | 7345na | 9415na |
| 2230 | 2300 | | Guam, KSDA/ AWR | | 15320as | |
| 2230 | 2300 | | USA, Voice of America | | 9570va | 11705va |
| | | | 15145va | | | |
| 2236 | 2300 | DRM | New Zealand, Radio NZ International | | | 13730pa |
| 2245 | 2300 | | India, All India Radio | | 9705eu | 9950as |
| | | | 11620as | 11645as | 13605as | |

## 2300 UTC - 7PM EDT / 6PM CDT / 4PM PDT

| | | | | | | |
|---|---|---|---|---|---|---|
| 2300 | 0000 | | Anguilla, Worldwide Univ Network | | | 6090am |
| 2300 | 0000 | | Australia, ABC NT Alice Springs | | | 2310do |
| | | | 4835do | | | |
| 2300 | 0000 | | Australia, ABC NT Katherine | | 5025do | |
| 2300 | 0000 | | Australia, ABC NT Tennant Creek | | | 4910do |
| 2300 | 0000 | | Bulgaria, Radio Bulgaria | | 9700na | 11700na |
| 2300 | 0000 | smtwhf | Canada, CBC NQ SW Service | | 9625na | |
| 2300 | 0000 | | Canada, CFRX Toronto ON | | 6070na | |
| 2300 | 0000 | | Canada, CFVP Calgary AB | | 6030na | |
| 2300 | 0000 | | Canada, CKZN St John's NF | | 6160na | |
| 2300 | 0000 | | Canada, CKZU Vancouver BC | | 6160na | |
| 2300 | 0000 | | China, China Radio International | | | 5915as |
| | | | 5990na | 6145na | 7410na | 9610as |
| | | | 11690as | 11790as | 11840na | |
| 2300 | 0000 | | Cuba, Radio Havana Cuba | | 13790sa | |
| 2300 | 0000 | | Egypt, Radio Cairo | | 6850na | |
| 2300 | 0000 | | Guyana, Voice of Guyana | | 3291do | |
| 2300 | 0000 | | India, All India Radio | | 9705eu | 9950as |
| | | | 11620as | 11645as | 13605as | |
| 2300 | 0000 | | Malaysia, RTM/Traxx FM | | 7295as | |
| 2300 | 0000 | | New Zealand, Radio NZ International | | | 15720pa |
| 2300 | 0000 | DRM | New Zealand, Radio NZ International | | | 13730pa |
| 2300 | 0000 | | Palau, T8WH/World Harvest | | 15550as | |
| 2300 | 0000 | vl | Papua New Guinea, Wantok R. Light | | | 7325do |
| 2300 | 0000 | | Russia, Voice of Russia | | 9665sa | 9890na |
| 2300 | 0000 | | UK, BBC World Service | | 3915as | 5965as |
| | | | 6195as | 9580as | 9740as | 9885as |
| | | | 11850as | 12010as | | |
| 2300 | 0000 | | USA, American Forces Network | | | 4319usb |
| | | | 5446usb | 5765usb | 6350usb | 7811usb |
| | | | 10320usb | 12133usb | 13362usb | |
| 2300 | 0000 | | USA, EWTN Vandiver AL | | 15610va | |
| 2300 | 0000 | | USA, Voice of America | | 5895va | 5915va |
| | | | 7480va | 7555as | 9415va | 11955va |
| 2300 | 0000 | | USA, WBOH Newport NC | | 5920am | |
| 2300 | 0000 | | USA, WHRA Greenbush ME | | 5850eu | |
| 2300 | 0000 | | USA, WHRI Cypress Creek SC | | | 5875na |
| | | | 7315va | 9615na | | |
| 2300 | 0000 | | USA, WINB Red Lion PA | | 9265ca | |
| 2300 | 0000 | | USA, WRMI Miami FL | | 9955am | |
| 2300 | 0000 | | USA, WTJC Newport NC | | 9370na | |
| 2300 | 0000 | | USA, WWCR Nashville TN | | 5070na | 7465na |
| | | | 9980na | 13845na | | |
| 2300 | 0000 | | USA, WWRB Manchester TN | | 3215na | 5050na |
| | | | 6890na | 9385va | | |
| 2300 | 0000 | | USA, WYFR/Family Radio Worldwide | | | 5950na |
| | | | 15255as | 15440na | 17750eu | |
| 2300 | 0000 | | Zambia CVC/ The Voice Africa | | | 4965af |
| 2300 | 2305 | vl | Liberia, ELWA | 4760do | 6070al | |
| 2300 | 2315 | | Nigeria, Radio Nigeria/Kaduna | | | 4770do |
| 2300 | 2330 | | Australia, Radio Australia | | 9660as | 12010pa |
| | | | 12080pa | 13690pa | 15230va | 15240pa |
| | | | 15560va | 17795va | | |
| 2300 | 2330 | | USA, Voice of America | | 9570va | 13755va |
| | | | 15145va | | | |
| 2300 | 2345 | | USA, WYFR/Family Radio Worldwide | | | 11740am |
| 2300 | 2345 | DRM | Vatican City, Vatican Radio | | 9755na | |
| 2305 | 0000 | | Canada, R Canada International | | | 6100na |
| 2315 | 2330 | | Croatia, Voice of Croatia | | 3985eu | 7375sa |
| 2315 | 2330 | mtwhf | Moldova, Radio PMR/Pridnestrovie | | | 6240na |
| 2330 | 0000 | | Australia, Radio Australia | | 9660as | 12010as |
| | | | 12080as | 13690as | 15230va | 15415as |
| | | | 15560va | 17750va | 17795va | |
| 2330 | 0000 | | USA, Voice of America | | 7460va | 9570va |
| | | | 13755va | 15145va | 15340va | |
| 2330 | 2358 | | Vietnam, Voice of Vietnam | | 9840as | 12020as |

### MT ENGLISH LANGUAGE SHORTWAVE STATION RESOURCE GUIDE

Albania, Radio Tirana ..... http://rtsh.sil.at/
Angola, Radio Nacional de Angola..... www.rna.ao/
Anguilla, Worldwide Univ Network ..... www.worldwideuniversitynetwork.com/
Argentina, RAE ..... www.radionacional.gov.ar/rae/rae.asp
Australia, ABC NT Alice Springs..... www.abc.net.au/radio/
Australia, ABC NT Katherine..... www.abc.net.au/radio/
Australia, ABC NT Tennant Creek ..... www.abc.net.au/radio/
Australia, CVC International ..... www.christianvision.com/
Australia, HCJB Global ..... www.hcjb.org/
Australia, Radio Australia ..... www.abc.net.au/ra/
Austria, AWR Europe..... www.awr2.org/
Austria, Radio Austria Intl ..... http://oe1.orf.at/service/international
Bahrain, Radio Bahrain..... www.radiobahrain.net/
Bangladesh, Bangla Betar ..... www.betar.org.bd/
Belarus, Radio ..... www.radiobelarus.tvr.by/eng/
Bhutan, BBS..... www.bbs.com.bt/
Bulgaria, Radio..... www.bnr.bg/
Canada, CBC NQ SW Service..... www.cbc.ca/north/
Canada, Radio Canada Intl..... www.rcinet.ca/
China, China Radio Intl ..... www.cri.cn/
Costa Rica, Worldwide Univ Network ..... www.worldwideuniversitynetwork.com/
Croatia, Croatian Radio ..... www.hrt.hr/
Cuba, Radio Havana ..... www.radiohc.cu/
Czech Rep, Radio Prague ..... www.radio.cz/en/
Finland, Overcomer Ministries ..... www.overcomerministries.org
France, Radio France Intl..... http://rfienglish.com
Germany, AWR Europe..... www.awr2.org/
Germany, CVC Intl/Voice Africa..... www.christianvision.com/
Germany, Deutsche Welle ..... www.dw-world.de/
Germany, Overcomer Ministries..... www.overcomerministry.org/
Germany, Pan American BC ..... www.radiopanam.com/
Germany, The Overcomer Ministries ..... www.overcomerministry.org/
Germany, TWR Europe..... www.twr.org/
Greece, Voice of Greece ..... www.voiceofgreece.gr/
Guam, AWR/KSDA..... www.awr2.org/
Guam, TWR/KTWR..... www.twr.org/
Guyana, Voice of..... http://voiceofguyana.com/
India, All India Radio ..... www.allindiaradio.org/
Indonesia, Voice of Indonesia ..... www.rri-online.com/
Iran, Voice of the Islamic Rep of Iran..... www2.irib.ir/worldservice/
Italy, IRRS ..... www.nexus.org
Japan, NHK World/Radio Japan..... www.nhk.or.jp/english/
Jordan, Radio..... www.jrtv.jo/rj/index.php
Latvia, Radio SWH ..... www.radioswh.lv/index.php
Liberia, ELWA ..... www.elwaministries.org/
Liberia, Star Radio ..... www.radioswh.lv/index.php
Libya, Voice of Africa..... www.ljbc.net/home.php
Lithuania, Radio Vilnius..... www.lrt.lt/
Malaysia, RTM/Traxx FM..... www.traxxfm.net/index.php
Malaysia, RTM/Voice of Malaysia..... http://202.190.233.9/vom/utama.htm
Monaco, TWR Europe ..... www.twr.org/
Nepal, Radio Nepal..... www.radionepal.org/
Netherlands, Radio Netherlands ..... www.radionetherlands.nl/
New Zealand, Radio NZ Intl ..... www.rnzi.com
Nigeria, Radio, Natl Svc/Abuja..... http://radionigeriaonline.com
Nigeria, Radio/Kaduna ..... http://radionigeriaonline.com
Nigeria, Voice of/ Ext. Svc Lagos..... www.voiceofnigeria.org
Oman, Radio Oman..... www.oman-tv.gov.om
Pakistan, Radio ..... www.radio.gov.pk
Papua New Guinea, NBC..... www.nbc.com.pg/
Papua New Guinea, Wantok R. Light..... http://wantokradio.net/
Philippines, Radio Pilipinas ..... www.radiopilipinas.com/
Poland, Polish Radio ..... www.polskieradio.pl/zagranica/gb/
Romania, Radio Romania Intl ..... www.rri.ro/
Russia, Voice of Russia..... www.vor.ru/world.html
Saudi Arabia, BSKSA..... www.saudiradio.net/
Slovakia, Radio Slovakia Int..... www.rsi.sk
Solomon Islands, SIBC ..... www.sibconline.com.sb/
South Africa, AWR Africa ..... www.awr2.org/
South Africa, Channel Africa..... www.channelafrica.org
South Africa, Trans World Radio..... www.twr.org/
South Korea, KBS World Radio ..... http://rki.kbs.co.kr/english/
Spain, Radio Exterior Espana..... www.ree.rne.es/
Sri Lanka, SLBC ..... www.slbc.lk
Swaziland, Trans World Radio..... www.twr.org/
Sweden, Radio..... www.sr.se/rs/english/
Syria, Radio Damascus..... www.rtv.gov.sy/
Taiwan, Radio Taiwan Intl ..... http://english.rti.org.tw/
Thailand, Radio ..... www.hsk9.com/
Turkey, Voice of..... www.trt,net.tr
UK, BBC World Service..... www.bbc.co.uk/worldservice/
UK, Bible Voice BC..... www.biblevoice.org/
UK, FEBA..... www.feba.org.uk
UK, Sudan Radio Service..... www.sudanradio.org/
Ukraine, Radio Ukraine Intl ..... www.nrcu.gov.ua/
USA, American Forces Radio ..... http://myafn.dodmedia.osd.mil/
USA, KNLS Anchor Point AK..... www.knls.org/
USA, KTBN Salt Lake City UT..... www.tbn.org/
USA, KWHR Naalehu HI..... www.whr.org/
USA, Voice of America ..... www.voanews.com/
USA, WBCQ Monticello ME..... www.wbcq.com/
USA, WBOH Newport NC..... www.fbnradio.com/
USA, WEWN Vandiver AL ..... www.ewtn.com
USA, WHRA Greenbush ME..... www.whr.org/
USA, WHRI Cypress Creek SC ..... www.whr.org/
USA, WINB Red Lion PA ..... www.winb.com/
USA, WRMI Miami FL..... www.wrmi.net/
USA, WTJC Newport NC..... www.fbnradio.com/
USA, WWCR Nashville TN..... www.wwcr.com
USA, WWRB Manchester TN..... www.wwrb.org/
USA, WYFR/Family Radio Worldwide ..... www.worldwide.familyradio.org
Uzbekistan, CVC International ..... www.christianvision.com/
Vatican City, Vatican Radio ..... www.vaticanradio.org
Vietnam, Voice of Vietnam..... www.vov.org.vn
Yemen, Rep of Yemen Radio ..... www.yemenradio.net
Zambia, CVC Intl/Christian Voice ..... www.christianvision.com/

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*http://mt-milcom.blogspot.com*

# Monitoring the Nation's Capital on the 4th

On the 4th of July we celebrate our 233rd birthday, and one of the largest celebrations in the country will occur in our Nation's Capital – Washington, D.C. One of the major players during this celebration will be military units from bases located in the National Capital Region (NCR).

If you want to keep track of what is happening during the day's festivities, I recommend you monitor the Joint National Capital Region (J-NCR) trunk radio system.

The National Capital Region (NCR) is one of the most important political and military areas in the US. The NCR is defined as the District of Columbia (Washington capital); Montgomery and Prince George's Counties of Maryland; Arlington, Fairfax, Loudoun, and Prince William Counties of Virginia. Within these, there are many military and federal installations and facilities which need to be in constant communication with each other and all their personnel.

Using M/A-COM's P25IP Trunked Internet Protocol (IP) Communications System, in combination with the NetworkFirst Interoperability solution, this J-NCR system is one of the first Department of Defense LMR deployments in the United States to simultaneously serve the U.S. Army, Navy, and Air Force.

## System Built in Two Phases

J-NCR Phase I provided interoperable mission-critical voice communications with civilian public safety agencies in the NCR region, including greater Washington DC, Maryland, Virginia and Fort Hamilton, New York. The NCR Phase I deployment covered 10 Army bases, including the Pentagon, Fort Belvoir, Fort Myer, Fort McNair, Fort Meade, Fort Hamilton, Fort Detrick, Walter Reed Army Medical Center (WRAMC) and Fort Hill. This phase linked more than 5,000 federal personnel and up to 58 public safety agencies in and around the NCR region.

Phase II added the US Navy (Naval District Washington, the Naval Academy, the U.S. Air Force (Bolling Air Force Base), among others to the NCR regional system. NCR Phase II provides seamless wide-area communications and convoy operations over a large footprint, and is one of the first tri-service DoD LMR systems.

The combination of the J-NCR Phases I and II links nearly 30 Department of Defense installations (17 Navy installations, 11 Army bases and Bolling Air Force Base), interoperating with more than 100 entities across the region.

The system provides base radio communications for many thousands of DoD users, while facilitating interoperable communications with existing state (Maryland, Virginia, New York and Pennsylvania), federal and metro Washington, DC first responders, These agencies are currently communicating on different frequencies and have disparate radio systems throughout the J-NCR and NDW region.

The digital system supports P25 trunking standard voice and data features including AES (Advanced Encryption Standard) encryption. This system operates using Department of Defense UHF spectrum in the 380-399.9 MHz frequency range.

Table 1 is a frequency profile of the system as best as we have been able to determine it. Table 2 is a list of talkgroups that have been observed on the system so far. We are still looking for additions, updates ad corrections. If you can help, please contact us at the address in the masthead.

So, if you're in the nation's capital for the Fourth, load up that handheld and keep it handy to monitor all the big celebrations on our nation's 233rd birthday.

### Table 1: J-NCR Land Mobile Radio Trunk System

**System ID: 001 P25 WACN: 580A0**
**Frequencies:**
101 381.6750/391.6750c 381.8250/391.8250c 381.9750/391.9750c 385.0125/395.0125c 385.2125/395.2125c 385.8875/395.8875c 386.1875/396.1875 386.3375/396.3375 [Fort Belvoir VA]
202 380.4500/390.4500c 380.7625/390.7625c 381.0750/391.0750 381.4250/391.4250 381.7000/391.7000 [Indian Head NSWC MD]
303 386.0625/396.0625c 386.9625/396.9625c 388.2625/398.2625 388.5625/398.5625 388.8875/398.8875 389.0375/399.0375 389.1625/399.1625 389.2375/399.2375c 389.4875/399.4875c 389.8375/399.8375 [Bolling AFB, DC]
404 380.4375/390.4375 380.8625/390.8625 386.3000/396.3000c [Patuxent River NAS MD]
505 380.4625/390.4625 380.9125/390.9125 385.1750/395.1750c 385.6875/395.6875c 385.9750/395.9750c 387.3250/397.3250 387.7750/397.7750 389.0625/399.0625 [Dahlgren NSWC VA]
606 385.0875/395.0875c 385.3250/395.3250c 385.7250/395.7250 385.9375/395.9375 387.1750/397.1750 387.4750/397.4750c 387.9750/397.975 [Bethesda NNMC, MD]
707 380.6625/390.6625 385.7125/395.7125c 387.2500/397.2500c [Quirauk Mountain (Site C) MD]
808 388.1125/398.1125c [Wallops Island, VA]
909 386.3125/396.3125c 386.5875/396.5875c 386.7625/396.7625 388.0250/398.0250 388.3875/398.3875c [US Naval Academy MD (Annapolis)]

**System ID: 002 P25 WACN: 580A0**
**Frequencies:**
101 380.0625/390.0625c 380.3250/390.3250c 380.3750/390.3750 380.6250/390.6250 380.6750/390.6750 380.8250/390.8250 380.9750/390.9750 381.0875/391.0875c 381.2375/391.2375c 381.2875/391.2875 381.6250/391.6250c 381.7750/391.7750 381.9250/391.9250 [Fort Myer VA]
202 380.2125/390.2125c 380.5250/390.5250c 380.7750/390.7750c 381.1375/391.1375 [Fort McNair DC]

**System ID: 005 WACN: 580A0**
**Frequencies:**
101 385.0250/395.0250c 385.9625/395.9625 387.3750/397.3750c 387.7375/397.7375 [Raven Rock AJCC, (Site-R) PA]

**System ID: 006 P25 WACN: 580A0**
**Frequencies:**
101 385.7000/395.7000c 385.8000/395.8000c 385.9500/395.9500 387.2375/397.2375c 387.5375/397.5375 387.6375/397.6375 [Fort Detrick MD]

**System ID: 007 P25 WACN: 580A0**
**Frequencies:**
101 380.3875/390.3875c 380.5500/390.5500c 380.8375/390.8375c 380.9875/390.9875c 381.3250/391.3250c 381.7875/391.7875 [Fort Meade MD]
202 389.5750/399.5750c [Army Research Lab/Adelphi MD]

**System ID: 008 P25 WACN: 580A0**
**Frequencies:**
101 380.0750/390.0750c 380.4250/390.4250c 380.7250/390.7250c [Tysons Corner (Site-E) VA]

**System ID: 009 P25 WACN: 580A0**
**Frequencies:**
101 380.2750/390.2750c 380.5750/390.5750c 380.8750/390.8750c 381.7375/391.7375 [Silver Hill, Prince George's, MD]

**System ID: 00a P25 WACN: 580A0**
**Frequencies:**
101 385.7875/395.7875c 387.2250/397.2250c 387.5250/397.5250 387.8250/397.8250 389.1250/399.1250 389.3000/399.3000 [Fort AP Hill VA]
202 385.8625/395.8625c 387.1875/397.1875c 387.4625/397.4625c 387.7875/397.7875c 389.0750/398.0750 [Bethesda NIIMA MD]
303 386.0125/396.0125c 386.9375/396.9375c 388.7375/398.7375c [Reston NGA VA]
404 380.5750/390/5750c 381.1000/391.1000c 381.9750/391.5750c [St. Louis DMA MO]
505 380.5125/390.5125c [Scott AFB IL]

**System ID: 00b WACN: 580A0**
**Base Frequency: 380.000 MHz, Spacing: 12.5-kHz, Offset: 380**
**Frequencies:**
101 380.0750/390.0750c 380.2750/390.2750 380.4250/390.4250c 380.5750/390.5750 380.7250/390.7250 [Fort Hamilton, Brooklyn, NY]

**System ID: 00c P25 WACN: 580A0**
**Frequencies:**
101 385.7125/395.7125c 385.9125/395.9125c 386.2125/396.2125c 386.5625/395.5625c 386.8125/396.8125c [Walter Reed Army Medical Center DC]

**System ID: 00d P25 WACN: 580A0**
**Frequencies:**
101 380.1250/390.1250c 380.4750/390.4750c 380.4875/390.4875c 380.9375/390.9375c [Germantown MD]

**System ID: 00f P25 WACN: 580A0**
**Frequencies:**
101 138.0375 138.1875 138.3375 138.5125 138.6875 139.0375 139.1875 [West Point Military Academy, NY]
202 138.1125 139.3375 139.4875 139.6375 140.6625c [West Point Military Academy, NY]

**Other possible J-NCR frequencies:**
386.9875 387.0625 388.1375 388.1625 388.1875 388.2125 388.3125 388.3375

## TABLE 2: J-NCR ALL SYSTEM TALKGROUPS:

**Walter Reed Army Medical Center**
2 Police Dispatch
3 Unknown user/usage
5 Fire Dispatch
6 Fire Alternate/Tactical <Channel 2>
7 Fire Alternate/Tactical <Channel 3>
9 Mass Casuality (MASCAL)
11 Public Works Roads and Grounds
15 Security "Vance" units
17 Security Desk
18 Security
19 Unknown user/usage
23 Unknown user/usage
31 Unknown user/usage
32 Security "Shepherd" units

**Fort Belvoir**
100 Fire Dispatch <Primary>
101 Fire <Alternate>
102 Military Police/Security <Primary>
103 Military Police/Security <Alternate>
104 Range Control
105 Unknown user/usage
108 Security-Gates
110 Airfield Operations
111 Engineering/Maintenance
112 Security
113 Engineering/Maintenance
114 Engineering/Maintenance <Channel 2>
115 Radio Technicians
120 Unknown user/usage
*125 Fairfax County Fire/Rescue <Channel 4B> Patch
*126 Fairfax County Police <Channel 2/6> (Mount Vernon/Franconia) Patch
128 Unknown user/usage
129 Unknown user/usage
130 Security
131 Radio Technicians
133 Unknown user/usage (encryption)
135 Joint Air Defense Ops Center (JADOC) – Remote sites (encryption)
136 Unknown user/usage (encryption)
150 Unknown user/usage (encryption)
160 Military Police "Enforcer" units may have replaced TG 102
161 Military Police
162 Military Police Training Exercise
163 Military Police Tactical

**Pentagon**
201 Force Protection Agency (encryption) <Channel 1> " Control"
202 Force Protection Agency (encryption) <Channel 2>
203 Force Protection Agency (encryption) <Channel 3>
204 Unknown usage (encryption)
207 Unknown usage (encryption)
208 Unknown usage
216 Unknown usage
220 Unknown usage (encryption)
230 Unknown usage (encryption)
231 Unknown usage (encryption)
240 Unknown usage (encryption)
243 Unknown usage
245 Unknown usage (encryption)
254 Unknown usage (encryption)
258 Unknown usage (encryption)
259 Unknown usage
271 Engineering
290 Arlington County Fire Department Dispatch Patch (Arlington TRS TG 34384) <1A>
292 Police Mutual Aid Radio System (P-MARS) Patch
303 Fort Myers Installation Operations Center
306 Fort Myers Fire Operations <Channel 1>
309 Fort Myers/Unknown usage "Charlie Units"
310 Fort Myers/Unknown usage "TCP Units"
311 Fort Myers Military Police/Security
312 Fort McNair Military Police
315 Fort Myers/Unknown usage
324 Unknown user/usage
330 Fort Myers/Unknown usage
385 Unknown user/usage

**Joint Forces HQ National Capital Region**
400 Command
401 Unknown usage
404 Unknown usage
406 Unknown usage
409 Unknown usage (encryption)
411 Unknown usage
412 Unknown usage
415 Unknown usage
418 Convoy
420 Unknown usage
426 Transportation
429 Unknown usage
431 Unknown usage
432 Unknown usage
439 Unknown usage
440 Unknown usage
441 Unknown usage
450 Unknown usage "Guardian Ops"
454 Training
455 Training
456 Training
460 Unknown usage
473 Convoy
474 Convoy
477 Unknown usage
479 Unknown usage
480 Unknown usage
482 Ceremonial Operations
483 Unknown usage
485 Operations
490 Unknown usage
508 Site R Security (Security provided by Pentagon Force Protection Agency)
522 Unknown user/usage

**Fort Detricki**
600 Unknown usage
602 Unknown usage
606 Unknown usage
608 Unknown usage
609 Electrical Maintenance
610 Police Dispatch
611 Police Tactical 2
612 Police Tactical
615 Unknown usage
637 Unknown usage
639 Unknown usage
644 Frederick County Fire Admin (Frederick County TRS TG 16016) Patch
*645 Frederick County EMS-50 Patch
649 Unknown usage
*650 Frederick County Fire Dispatch Patch
*651 Frederick County EMS-10 Patch
*652 Frederick County Fire Tac-20 Patch
*653 Frederick County Fire Tac-30 Patch
*654 Frederick County Sheriff Dispatch Patch
659 Maintenance
669 Security

**Fort Meade**
700 Fire Dispatch Operations <Channel 1>
701 Fire Operations <Channel 2>
702 EMS
705 EMS Dispatch Operations <Channel 1>
706 Fire Administration
711 Military Police
712 Military Police Tactical <Channel 2>
713 Military Police Traffic Control
714 Military Police Investigators <Channel 3>
715 Military Police NCIC Operations
720 Telecommunications
721 Telecommunications
723 Fort Meade/Unknown usage
726 Public Works
740 Military Police K-9 Units
746 Emergency Operations Center
748 Military Police Tactical <Channel 4>
749 Police Talk <Channel 9>
751 Fire Administration Tactical
752 Military Police Supervisors
753 Wachenhut Security (Gates)
754 Desk Operations
760 Administrative Channel
779 Fire R&E channel

**Fort A. P. Hill**
1000 Fueling
1004 Range Control
1005 Range Control Live Fire 1
1006 Range Control Maintenance
1009 Training Base
1012 Range Control
1013 Police/PMO
1014 Unknown user/usage
1018 Fire Dispatch
1019 Fireground
1020 Safety Channel
1022 Engineer Base
1035 Unknown user/usage
1036 Unknown user/usage
1054 911 Channel
1056 Statewide EMS (155.2050) Patch
1058 Caroline County Fire Dispatch (154.3850) Patch
1059 Caroline County Sheriff Dispatch (158.7800) Patch
1060 HEAR (155.3400) Patch
1061 SIRS (39.5400) Patch
1070 Weapons/Equipment Testing <Channel 1>
1071 Weapons/Equipment Testing <Channel 2>
1072 Weapons/Equipment Testing
1076 Weapons/Equipment Testing
1080 Alpha Net
1081 Bravo Net
1085 Training Net
1090 Training Net
1091 Training Net
1092 Training Net
1093 Training Net
1094 Training Net
1095 Training Net
1097 Training Net
1100 Fort Hamilton Military Police Police/Security
1116 Fort Hamilton Radio Testing

**West Point Military Academy**
1419 Range Control
1420 Range Control
1460 Unknown usage "Saber Base"
1503 Military Police <Channel 1>
1504 Unknown usage
1510 Fire Department
1518 EMS
1527 Security
1540 Unknown usage
1553 Unknown usage
1573 Keller Hospital
1592 Unknown usage "36 Control" (Patch to 46.1600)
1593 *EMS Patch (153.8600)
1594 *EMS HEAR Patch (155.4000)
1595 *Police Department Inter-System
1596 *High Falls Police Department
1611 NGA/NIMA Security (encryption)
1612 NGA/NIMA Security
1616 NGA/NIMA Security
1621 NGA/NIMA Unknown usage (encryption)
1622 NGA/NIMA Unknown usage (encryption)
1641 NGA/NIMA Unknown usage
1643 NGA/NIMA Unknown usage (encryption)
1644 Defense Mapping Agency Aerospace Center, St. Louis, MO
1651 NGA/NIMA Unknown user/usage
1654 NGA/NIMA Unknown usage (encryption)
8126 Fort Myers Police
8627 Fort Meade Military Police Dispatch (usually talkgroup 711)
8638 Fort Meade Fire
8639 Fort Meade Fire
8640 Fort Meade Fire
8644 Fort Meade Fire
10001 Bolling AFB Unknown usage (encryption)
10301 Bolling AFB Unknown usage (encryption)
22311 NSWC Dahlgren Radio Techs

**National Naval Medical Center**
22352 Building Maintenance "BF##" units
22356 Link to Suburban Hospital
22360 Unknown user/usage
22361 Fire Inspectors
22368 Unknown user/usage
22373 EMS - Patient Transport/Status
22375 Unknown user/usage
22379 Fire Main Dispatch
22380 Unknown user/usage "Spectre" units
22382 Police
22399 Police Dispatch <Channel 4>

**US Naval Academy (USNA)**
22500 Unknown usage
22501 Police Dispatch
22502 Unknown usage
22503 Unknown usage
22506 Fire Department Dispatch
22508 Fire Department
22512 Police/Security Dispatch
22514 Fire Prevention/Inspectors
22520 Fire Department Tactical

**Washington Navy Yard/Naval Research Labs**
22750 Fire Department
22760 Unknown usage
22761 Unknown usage
22780 Police/Security
22781 Police/Security
22789 Police/Security
22838 National Naval Medical Center EMS
25002 Indian Head NSWC Unknown usage

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# A Fed Files Summer Vacation

It's summer time, and for most people that means travel and vacation time. It also means that some folks get a chance to listen to new frequencies and agencies in areas they don't travel to very often. Since I pretty much travel for a living (I often tell people my job is flying and I do television engineering between flights), I have been taking along my scanners and computers for quite a while and have logged many interesting frequencies while traveling.

## ❖ Traveling with Scanners

What should you bring along? While many scanner listeners have one or maybe two scanners, more serious monitoring enthusiasts carry more. I usually travel with three or four handheld radios in my carry-on backpack, and have a couple more base units in my checked baggage. And no, I have never had any questioning or hassles from the airlines or the Transportation Security Administration about traveling with the scanners – just don't use any scanners while on board the airplane!

Why so many radios? I usually set up at least one to do nothing but search. Another radio will have some local frequencies or trunked systems that I have either programmed in ahead of time, or put in once I get set up at my hotel. And I often carry with me one of the scanners that features a near-field signal search feature, such as "Close Call" or "Signal Stalker." You would be surprised what you can find active in some situations.

I also set up a radio and computer to search or scan and log the activities it has picked up. There are several good software packages out there for various scanners that will allow for unattended logging of signals. Sometimes I set up the radio and computer with me at work, but other times I have actually left it set up in my hotel room while I am away.

Some might cringe at leaving all that gear sitting out in the hotel room, but so far I have had no trouble doing so. I usually set it up so that I can leave the computer screen closed but still running, and keep the volume on the scanner turned down.

photo courtesy Rachel Baughn

And speaking of computers, I have recently purchased one of the new generation of "Net Book" computers that are inexpensive, small, light and great for travel. I use it entirely for scanning and programming radios, and so far it has worked out great.

## ❖ Hitting the Road

OK, So we've got all the gear packed, our frequencies programmed, and we are ready to go. So where are we headed? Here are a few of the cities I have been to over the last few months. Note that the P-25 digital frequencies will have the Network Access Code (NAC) listed when I could catch it.

## ❖ Asheville, NC

One big change in North Carolina since my last visit is that the Blue Ridge Parkway radio system has changed frequencies and switched to P-25 digital. The old BRP frequency of 167.1750 MHz has been silent for a while now and listeners all along the Blue Ridge Parkway have reported new frequencies in use:

172.4500 N4c5
172.4750
172.7250 N051 & N120
172.7500 N110
173.7625

Most of the traffic on these new frequencies is P-25 digital, but very often the dispatchers will broadcast in analog as well. The P-25 NACs I have listed are ones that I logged, but there may be others used along the BRP radio system. For maps and other information about the Blue Ridge Parkway check the National Parks Service web site, **www.nps.gov/blri/**

## ❖ Augusta, GA

It had been about 6 years since I had been in the Augusta, Georgia area and the last time I was there I picked up a VHF federal trunked system. At the time I assumed it was coming from Fort Gordon, but later found out it was actually coming from the Savannah River Site of the Department of Energy over in Aiken County, South Carolina.

You can learn more about the Savannah River Site at their web site, **www.srs.gov/general/srs-home.html**. Their radio system is a Motorola Type II VHF system using P-25 digital mode for the voice channels. Here is the system information:

System ID: 5e08
Base: 162.5
Step: 12.5
Offset: 380
Base 2: 164.225
Step 2: 12.5
Offset 2: 518

| | |
|---|---|
| 162.0250 | 164.3750 |
| 162.2250 | 164.7625 |
| 162.6125 | 165.2625 |
| 163.3750 | 166.0000 |
| 164.2250 | 166.2250 |
| 164.2750 | 166.8125 |
| 164.3250 | 166.8875 |

This system was broadcasting an NAC of N085 on the voice channels. Some encrypted traffic was heard on what are probably the security and public safety channels on this system.

## ❖ Boston, MA

I was only in Boston for a couple of days, but did log some activity during my brief stay.

| | |
|---|---|
| 165.2125 N001 | US Secret Service MIKE |
| 165.2375 N301 | DHS Customs NET 1 |
| 165.3750 N001 | US Secret Service CHARLIE |
| 165.7375 N291 | Unknown agency, possibly CBP Customs |
| 166.9500 N109 | National Parks Service |
| 167.7875 N167 | FBI |
| 167.9500 N109 | National Parks Service |
| 170.7500 N293 | US Marshals |
| 172.0750 N167 | FBI |
| 172.9000 N001 | TSA at Boston Logan Airport |
| 409.9375 N482 | US Postal Inspectors |
| 415.2000 N295 | Federal Protective Service |
| 417.2000 N295 | Federal Protective Service |

## ❖ Chicago, IL

Although I often travel through Chicago, changing planes at O'Hare airport, I am usually too pressed for time to do any serious scanning. But a couple of long layovers have provided some updates to my logs. The TSA is always busy at major airports and Chicago is no exception. On my recent trips, I have begun to notice more encrypted transmissions from the TSA, which is unusual for that agency.

169.1625 N001
169.3000
172.1500 N001
172.9000

Besides the TSA, the Customs and Border Patrol were particularly busy with international arrivals at ORD. There seem to be multiple channels with CBP activity at O'Hare and I even managed to catch references to some radio channel numbers.

163.4750 NC02 Referred to as "Channel 13"
163.6250 NC02
163.6750 NC02
163.7250 NC02
163.7500 NC02
165.8500 NC02
172.8625 NC02 Referred to as "Channel 14"

Some have suggested that these are used by Immigrations and Customs Enforcement, (ICE) but when I have traveled back into the US, all the folks I have seen at the airports checking me back in are with CBP.

## ❖ Las Vegas

Late in 2008 on a trip to Las Vegas, I noted some changes in the many UHF trunked sites that the federal government operates in and around the area. It appears that many of the sites were re-channeled due to new narrowband requirements and probably to accommodate the new 9 MHz repeater offsets that federal users are now required to use.

Over several trips, I worked on confirming these changes to the trunked system operated by the National Nuclear Security Administration, or NNSA, **http://nnsa.energy.gov/**. This system covers most of southern Nevada and includes the NNSA Nevada Test Site used for nuclear testing, **www.nv.doe.gov/nts/default.htm**.

I was only able to confirm three of the many sites on the NNSA trunked system. This is a Motorola Type II trunked system using P-25 digital mode on the voice channels, which were using an NAC value of N264. Here is the system information for programming your scanner:

**System ID: 7526**
Base: 406.1
Step: 12.5
Offset: 380
Base 2: 410.5
Step 2: 25
Offset 2: 710

**SITE 04** – Located at DoE NNSA Facility in Las Vegas
406.4000 409.5250
406.9875 409.9250
407.3625 410.1625
408.3625

**SITE 06** – Located at Angel Peak in Clark County
406.1125 409.3000
406.5500 410.5500
408.7000

**SITE 10** – Located at Nellis Air Force Base in Clark County
406.5000 408.9625
406.7875 409.1125
407.3000 409.5625
407.5000 409.7125
407.8625 410.1750
408.1500

The Nellis site is usually hopping with activity, but on recent trips I have noted that Site 10 does not seem to have the signal coverage that it used to in the Las Vegas metro area. This may be as a result of moving antenna sites or reducing power to avoid interference issues.

## ❖ Lexington, KY

On a recent trip to the Lexington, Kentucky, area I spent some time monitoring the Federal Medical Center, part of the US Bureau of Prisons. They are utilizing a UHF Motorola Type II trunked radio system that utilizes APCO digital mode for the voice channels. The system has undergone some changes over the past year with some new frequencies, probably a part of the general re-channeling of the federal UHF spectrum. Here is the old system information:

**System ID: 6610**
Base: 406.0000
Step: 25.0
Offset: 380
408.1000
408.5500
409.3500
410.1500

On this visit, I found this system in place:

**System ID: da35**
Base: 406.2125
Step: 12.5
Offset: 414
406.2125
406.8125
407.4125
408.2500

This system is broadcasting an NAC of N355 on the voice channels.

Remember, if you are interested in more information about the Bureau of Prisons radio systems, you can find the latest database available for downloading from the "Readers Only" section of the *Monitoring Times* web site.

Some other federal traffic I logged while in Lexington:

164.1750 CSQ Morse ID and paging, probably from the VA Medical Center
407.1625 CSQ Unknown agency, Morse ID
407.8375 N293 VAMC Lexington
408.0375 VAMC Lexington
416.5500 N286 Unknown agency
417.0000 N286 Unknown agency
419.1250 CSQ US Postal Service truck operations

## ❖ Los Angeles, CA

Searching the federal radio bands in the Los Angeles area is always interesting. There is usually plenty of action and new frequencies often show up with activity. This visit was no exception. I noted several active surveillances taking place on multiple channels. The frequencies are from the pool allocated to the Border Patrol and Justice Department, but they now appear to be used by the Immigration and Customs Enforcement, or ICE.

ICE has not developed a common channel plan, but they do appear to be using a lot of the legacy INS frequencies that were shared with the Border Patrol. Here is what was active:

163.7500 N109
165.8250 N108
168.8250 N104
168.9250 N115
168.9750 N106

Besides the possible ICE frequencies, there were other federal frequencies that were busy:

165.9500 N009

I also found some active law-enforcement activity on this common IRS channel. I had just been asking listeners to keep an ear out on the Treasury Department channels that have silent lately to see if they have started using P-25 radios yet, and they have – at least on the West Coast!

167.2250 N374 Unknown
167.5125 N283 Unknown
172.4500 N148

These frequencies are complete unknowns to me. The first two channels fall into what are normally FBI frequencies, but the NACs are not normal for the FBI. Most of the traffic was encrypted.

406.3375 N482 US Postal Inspectors
406.6625 D165 Federal Reserve Branch, Los Angeles
407.7750 N482 US Postal Inspectors

And here is the US Bureau of Prisons Metropolitan Detention Center in downtown Los Angeles:

**Motorola Type II, P-25 Voice, NAC = N05b**
**System ID: ca0b**
Base: 406.0
Step: 12.5
Offset: 397
406.8125
409.4125
409.6750
409.9500

## ❖ Miami, FL

My last visits through South Florida have been too short, but I did manage to log a few things while in the area. Here is what was busy on my trips:

164.4000 N001 US Secret Service PAPA
164.6500 N001 US Secret Service TANGO
164.9625 100.0 pl CBP Customs TAC 21
165.2375 100.0 pl CBP Customs NET 1 Still analog in South Florida!
166.3000 100.0 pl CBP Customs NET 26
167.2625 167.9 pl FBI
167.4375 167.9 pl FBI
167.6625 167.9 pl FBI
167.7375 N167 FBI only P-25 channel noted so far
167.7625 167.9 pl FBI
168.7500 167.9 pl FBI
168.8500 100.0 CBP Customs at Miami International Airport
169.4500 100.0 pl CBP Customs NET 2
169.5750 167.9 pl FBI
171.4375 N653 Federal Interoperability repeater
171.6250 N555 Everglades National Park operations
171.7750 N61f Unknown agency
172.5250 N555 Everglades National Park
172.6750 N293 Unknown agency
407.7750 N482 US Postal Inspectors
415.2000 192.8 pl Federal Protective Service

That's all for this road trip. Let us know what you heard as you traveled the country on your summer vacations. And be sure to check back with the *Fed Files* again in September for more federal monitoring!

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# Radio Waves and Water Waves

This July column will be read as we enter the 2009 Atlantic Hurricane season. Many people debate the value of radio in this technological age, but I must state that it is more valuable than ever. My wife, Dawn, and I recently rented a condominium in Myrtle Beach, SC. While exploring the unit to see what was there, I could not help but notice the AM, FM, CD player mounted under a kitchen cupboard. Further investigation showed it was also a NOAA weather radio with an alert function. In the drawer below this, was a small AM/FM radio, which could be charged with an internal crank generator.

When you live in a hurricane prone area, you need to have information. Power failures are a common occurrence in severe weather, so having portable radios is a must. The Myrtle Beach weather radio, on 162.400 MHz, KEC95, gives extensive weather information including the marine forecast and tide times. It also gave warning for rip tides along the beaches, high surf, etc.

Use the weather channels whenever you are in a marine area for continuous forecasts. While we were there we received one tornado alert and actually had a tornado touch down in North Carolina. The recent wild fires in the Myrtle Beach area came within a ten-minute drive of where we stayed. If we had been there I would have wanted to have my scanner, weather radio and amateur radio transceiver to get information.

Our long trip to and from Kingston, Ontario, was made much simpler because my amateur VHF radio can tune the weather band. We avoided being caught in a snowstorm on the way down and left early to avoid heavy rain on the trip back home. I purchased a weather radio with an internal crank generator while I was there. It works well and has become part of my emergency radio kit.

In Canada, the same weather channels are active and we have continuous marine weather broadcasts on the VHF radio as well. They provide detailed forecasts and weather synopses for the marine areas they cover. They use 161.775 or 161.65 MHz depending on the area you are in – that is, marine channels 83B and 21B.

While in Myrtle Beach I did not do much HF listening as I was in a poor location and had no outside antenna. I did get in some VHF marine listening both at our home and mobile. The Intracoastal Waterway was within a five-minute drive and there were some vessels transiting the system. I found out that the bridges on the Intracoastal in South Carolina monitor channel 9, while the bridges in North Carolina monitor channel 13. (On the Great Lakes, Channel 13 is reserved for communications between commercial vessels.) Channel 16 was used for calling and distress. The USCG often uses channel 22A for broadcasts and other traffic.

Traffic control in major harbors is usually found on channels 11, 12 or 14. For instance, the Port of Sept Isles, Quebec uses channel 12. Traffic for the les Escoumains pilot station is on channel 14. The tugs in the port use channel 18A. I remind marine radio users that to hear the A channels you need to be on the Canadian or United States settings rather than the International settings. The A frequency is the lower frequency (156 MHz range) of the duplex pair.

As found on the Internet, traffic on the Mississippi/Ohio River system also uses VHF radio. In the Ashland, Ironton, Huntington area, the locks are on channel 14. McGinnis Inc. uses channel 10. Ashland Inc. uses channel 17, Sanyo Harbor uses channel 7, and the Boat Store uses channel 10. The U.S. Corps of Engineers can be heard on channel 82. Above Cairo, they monitor channels 16 and 13, while working frequencies are channels 13 and 14.

Of course, the St. Lawrence Seaway control uses channels 11, 12 13 and 14 as you traverse the system. You do get channel 9 used below Quebec City and channel 10 is used in Montreal Harbor. The locks of the Seaway alternate between channels 17 and 13, as you proceed, starting with channel 17 at each end of the system. The Locks of the Welland Canal use channel 17 for up-bound traffic and channel 66A for down-bound traffic. Overall control of the Welland Canal is on channel 14.

Be sure to scan the marine channels in any harbor to find other channels in use. Again, I suggest the Canadian or United States settings for scanning marine channels in the North American harbors. You can also scan from 450 to 470 MHz for on-deck and shore facility frequencies. The 450 MHz range is often used by deck crews for internal communications.


***Tug Vigilant 1 transporting material to Wolfe Island for the 86 windmills being constructed there.***

## ❖ Amateur Radio

When I was in Myrtle Beach I purchased a book entitled *Final Patrol*. This book tells the stories of all the submarines that have been preserved and put on display in the United States. I plan to visit some of the sites in my travels, since I have always been interested in "The Silent Service."

While reading the book I found out the author, Don Keith, is N4KC and active on the

*Cable laying ship Henry P. Lading which was brought here to bury the cable from Wolfe Island to the Mainland.*

bands. I sent him an email and got a very nice reply. We plan to have a chat on the air, which would be great.

He did mention an amateur net where the submarine veterans meet. They are on 14.343 MHz from 1130 to 1300 Eastern Time, Monday through Saturday. On Friday and Saturday evenings, they meet on 7.279 MHz at 2000 Eastern Time. I plan to check in during the summer. It should be an interesting net.

Of course, the Maritime Mobile Service Net still meets on 14. 300 MHz every day and provides interesting listening. I have just heard a pleasure craft from Guatemala on the frequency.

Regarding emergency traffic, the Hurricane Watch Net always meets on 14.325 MHz whenever a hurricane has formed. Bulletins from the National Hurricane Centre and traffic from affected areas can be heard. I always monitor in case I can handle a message into Canada.

I would be remiss if I didn't remind people to monitor their local VHF amateur repeaters during the summer boating season. I often hear pleasure craft and some freighters on our two-meter repeater, VE3KBR. I have also heard pleasure craft on the repeater using links to the IRLP (Internet Radio Linking Project) and Echolink. It has been my pleasure to relay messages and provide weather information from my computer radar screen sites, etc.

I also enjoyed using the W4GS repeater system while in Myrtle Beach. The Grand Strand Amateur Radio Club maintains three two-meter repeaters and one 70 cm repeater in the area. Meeting Jim Roble, N4GSA, Bob Gagliardi, N4XML and other local amateurs for breakfast was a real treat! Be sure to join them if you are in the area.

## ❖ Summer DX

With the longer days, propagation on the 2 and 4 MHz marine frequencies dies out earlier, but the higher frequency bands will be more active. The Arctic Navigation Season will begin and several Canadian Marine stations will become active. This will provide a chance to catch a rare station or two. There are also some Australian Stations, which should be coming through on the high frequencies. I did catch Churchill Manitoba last year and have heard the Royal Bahamas Defense Force this winter.

Since I will be home much more this summer, I plan to enjoy the chasing of some DX on the marine bands as well as the amateur bands. I have already planned some antenna maintenance and improvements. In the sidebar I will list a few stations and frequencies you might try.

## ❖ The World of Communications is Changing!

I teach the Marine Radio License course here in Kingston and have several already lined up for this year. While walking through a local boating store, where I teach some classes, I noticed their electronics display. All the marine radios are now DSC models.

I also noticed for the first time, they were selling an AIS system for pleasure craft. This Automatic Identification System is a transponder giving out the ship's name, course, speed, etc. It is mandatory on commercial ships, but voluntary on pleasure craft. If connected to your electronic charts, it will show every vessel in the vicinity that has AIS. It does cost around $800, but is sure worth it in crowded waterways.

I also saw the Spot Satellite Messenger in this store and in several radio store ads. This costs around $170, and the tracking service is $49 per year. It is a personal device that uses the GPS satellites to determine your position and then uses the Spot system to relay that information. Your position can be relayed to a rescue center in an emergency or you can send a request for help to family and friends. You can check in to let people know where you are and that you are OK! You can even save and send your positions, so people can track you on a map.

I was forwarded a message from Susan Donahue at Skyya Communications about this system as well. Spot also instituted a public safety message to improve boating safety. I plan to gather more information on this item.

What a change from the days when ships sent a telegram from port, delivered to the telegraph office on bicycle by people like my father!

As always, I would appreciate any monitoring reports and frequency information to broaden the scope of this column.

### VHF Frequencies Mentioned

| Chan | Frequency | Chan | Frequency |
|---|---|---|---|
| 9 | 156.45 MHz | 14 | 156.7 MHz |
| 10 | 156.5 MHz | 17 | 156.85 MHz |
| 11 | 156.55 MHz | 18A | 156.9 MHZ |
| 12 | 156.6 MHz | 66A | 156.325 MHz |
| 13 | 156.65 MHz | 82A | 157.125 MHz |

### HF Frequencies to Explore (MHz)

| | | |
|---|---|---|
| Australia | | |
| VMC | Charleville | 8.1760, 12.3560, 16.5460 |
| VMW | Wiluna | 8.1130, 12.3620, 16.528 |
| Canada ( Arctic) | | |
| VFF | Iqaluit | 6.507 |
| | Resolute | 4.363 |
| | Coral Harbour | 6.513 |
| VFA | Inuvik | 5.803 , 6218.6 |
| | Cambridge Bay | 4.363 |
| | Hay River | 4.363 |
| Bahamas | | |
| | | 8.156 |


*Laker, Tim S. Dool, up bound in the Seaway. This was just after she received this new name; she was originally the Senneville. My father, brother and I had a trip on her in 1982.*

# BELOW 500 kHz

**DXING THE BASEMENT BAND**

*Kevin Carey, WB2QMY*
*kevincarey@monitoringtimes.com*

# No Sunspots? No Problem.

The slow start of Solar Cycle 24 has been a big topic of discussion lately. The cycle is now clearly overdue in terms of the usual "ramp-up" that we expect to see at the beginning of a new 11-year cycle. Many predictions were offered in the years leading up to the new cycle, but I don't recall any that came close to what we are seeing right now.

To me, this plainly shows that we still cannot reliably predict nor fully understand the workings of our Universe, despite remarkable advancements in science and technology over the past two centuries. One thing seems certain: The new cycle will arrive on a timetable that is independent of what we want or expect it to be!

Those of us who enjoy HF work (3-30 MHz) are understandably disappointed at the low sunspot activity. While DX opportunities are by no means absent, conditions on the higher frequency bands – especially 10 and 15 meters – have been much quieter than we would like them to be. The good news is that Longwave has not suffered any such degradation, and in fact seems to be *enhanced* during years of low sunspot activity. This finding has been strongly supported by the logging submittals I receive from *Monitoring Times* readers and contributors to the LWCA's *Lowdown* Journal (**www.lwca.org**).

If you're looking for a place to escape the sunspot doldrums, check out longwave! What can you expect to hear? Much will depend on your equipment, local conditions, and your patience as an operator. One of our readers, Ron Bailey (AA4S) put together an updated list of his best non-U.S. catches from his location in North Carolina. These recent logs are shown in Table 1 below.

Ron uses a Drake R8A receiver, a tunable DSP filter (MFJ 784B), and *seven* 560-foot long terminated Beverages oriented in various directions. Although this antenna system may be exceptional, surprisingly good results are being achieved by listeners with far more modest setups. The key is to give it a try with what you have, and then experiment with different antennas to see how things can be improved.

**TABLE 1. NON-U.S. CATCHES – RON BAILEY (NC)**

| FRQ | ID | PR/ITU | CITY |
|---|---|---|---|
| 200 | UAB | BC | Anahim Lake |
| 208 | YSK | NU | Sanikiluaq |
| 210 | CLO | CLM | Cali |
| 233 | UM | NL | Churchill Falls |
| 244 | TH | MB | Thompson |
| 248 | WG | MB | Winnipeg |
| 250 | FO | MB | Flin Flon |
| 251 | YCD | BC | Nanaimo |
| 254 | 5B | PE | Summerside |
| 269 | UDE | MB | Delta |
| 281 | CA | NF | Cartwright |
| 284 | QD | MB | The Pas |
| 284 | RT | NU | Rankin Inlet |
| 305 | YQ | MB | Churchill |
| 317 | VC | SK | La Ronge |
| 320 | YQF | AB | Red Deer |
| 323 | W4 | MB | Jenpeg |
| 329 | YEK | NU | Arviat |
| 336 | LF | MB | La Salle |
| 339 | YFT | NL | Makkovik |
| 350 | DF | NL | Deer Lake |
| 350 | F2 | NL | Searose FPSO |
| 350 | NY | BC | Enderby |
| 356 | AY | NF | St. Anthony |
| 359 | YQZ | BC | Quesnel |
| 364 | 2B | NL | Springdale |
| 364 | ZHZ | NS | Halifax |
| 368 | SX | BC | Cranbrook |
| 368 | ZP | BC | Sandspit |
| 370 | LMS | HND | La Mesa |
| 370 | YBV | MB | Berens River |
| 375 | GUA | BTM | Guatemala City |
| 379 | YBE | SK | Uranium City |
| 385 | WL | BC | Williams Lake |
| 390 | JT | NL | Stephenville |
| 391 | DDP | PR | San Juan |
| 394 | DQ | BC | Dawson Creek |
| 395 | YL | MB | Lynn Lake |
| 396 | JC | NL | Rigolet |
| 400 | QQ | BC | Comox |
| 406 | YLJ | SK | Meadow Lake |
| 415 | CBC | CYM | Catman Brac |
| 450 | PPA | DOM | Puerto Plata |

## ❖ Tips for Better Reception

I'm often asked to provide some tips for improved LW reception. Here, in no particular order, are some techniques that have proven useful to me over the years. These should be even more helpful during the challenging summer months when static crashes can be an obstacle:

- Tune slowly to avoid missing signals! Beacons are usually assigned to 1 kHz intervals. If you tune too fast, you might skip right over some good DX.
- When trying for distant beacons, use your receiver's BFO or SSB/CW setting. You'll find it much easier to sort through weak signals by "zero beating" their carriers and listening to the keyed Morse ID.
- Use a narrow bandwidth setting. A narrow filter (500 Hz or less) will go a long way toward blocking out adjacent "pest" signals.
- Use a good set of headphones. They will help you focus on weak signals, and avoid disturbing those around you.
- Use a loop or active antenna specifically designed for longwave. Despite their small size, these antennas often outperform "longwire" types, and almost always provide quieter reception.
- If possible, turn off all static-producing appliances such as TV sets, computers, dimmer switches, electric motors, fluorescent lights, etc.

## ❖ LF Propagation Site

How would you like to have a website where you could go to view current and near-term propagation conditions for longwave? There is such a site run by Thomas Giella, NZ4O, and it can be found at: **www.kn4lf.com/kn4lf6.htm**. For LF information, scroll down until you reach the heading "*Global LF 30-300 KC Propagation Conditions Expected with Emphasis on LF AM Broadcast Band.*" This site includes links to space weather information, QRN predictions, and lightning strike data, and more.

## ❖ SAQ 17.2 kHz Schedule

Our friends at the SAQ museum in Sweden (**www.alexander.n.se**) have announced some future operating events where the last working Alexanderson Alternator will be fired up. This old transmitter contains no tubes or transistors. RF is generated directly by spinning an AC alternator at radio frequencies – in this case 17.2 kHz. The scheduled operating events are: Saturday, October 24 at 09:00 UTC, and Thursday, December 24 (Christmas Eve) at 08:00 UTC. Check out the SAQ website for more information.


***This QSL Card is issued by station SAQ (17.2 kHz) from Grimeton, Sweden***

## ❖ Mailbag

Reader "Ted" in Phnom Penh, Cambodia, has been hearing the ID "PNF" over and over again near 378 kHz. He sent an .MP3 file of the signal for me to listen to. He hears this signal almost all the time, but it will sometimes go away for a day or so and then return. He wonders if we might have any ideas about its origin.

Ted, thanks for writing to Below 500 kHz. We rarely get longwave reports from your part of the world, so welcome aboard! I've analyzed the audio file you sent, and I'm convinced this is a keying error, most likely of PNP, 376 kHz. This is a non-directional beacon (NDB) which serves the Pochentong International Airport in Phnom Penh.

*See you next month!*

George Zeller
georgezeller@monitoringtimes.com

# Radio Dr. Tim Raided in Germany

Longtime European pirate station **Radio Dr. Tim** was raided on April 19 by both the German PTT and German police officials. The authorities confiscated considerable equipment from the alleged operator and also confiscated a variety of QSL information. Additional information on this raid was not yet available at press time for *MT*.

## ❖ Pirates Week

We often mention Ragnar Daneskjold's *Pirates Week* podcast in this column. Ragnar normally produces a detailed review of pirate radio activity every week. All pirate DXers will find Ragnar's newsworthy programs to be both valuable and entertaining. They are not currently broadcast on licensed radio stations, but they can be downloaded from the internet via Ragnar's web site. The place to go to hear these podcasts is **http://shortwavepirate.info/pw/wordpress/**

## ❖ New BLANDX

Bill Kyle, the CEO of the BLANDX Corporation, notes that a new edition of BLANDX was released in time for April Fool's Day, a major pirate holiday. This hilarious longtime parody of everything involved in DXing is virtually mandatory reading for all of us. You can check out Kyle's latest antics on the internet at **www.blandx.com/** URL. Make sure that your funny bone is in order before you read the new material.

## ❖ Johnny Guitarman RIP

Lee Silvi reports that he received an e-mail from **MAC Radio**. MAC says that Johnny Guitarman, who sometimes is featured on their shows, passed away a year or two ago. But, they replay his material as a memorial to him.

## ❖ Columbus NASWA Chapter

On Saturday, April 11, the speaker at the Columbus, Ohio, chapter meeting of the North American Shortwave Association at Universal Radio in Reynoldsburg was your columnist George Zeller from *Monitoring Times*. We had a lively discussion of the pirate radio DX scene. Bill Matthews of Columbus won the grand prize from Universal Radio in the prize raffle, an Eton Mini M300PE shortwave portable. This chapter meets the second Tuesday of every month at Universal Radio.

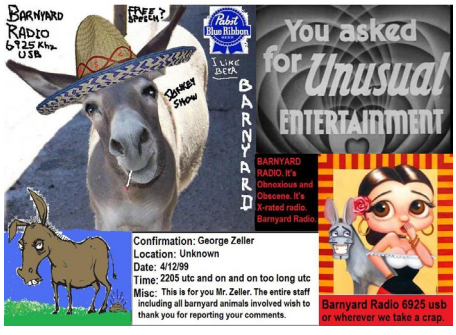
Following the Columbus NASWA meeting, George Zeller was then a guest later the same evening on **WBCQ**, who carried programming from pirate station **Radio Jamba International** on their Area 51 program. During the **WBCQ** show, Zeller interviewed Ultra Man for *MT*, the young boy announcer who sometimes hosts shows on **MAC Shortwave**.

## ❖ What We Are Hearing

*Monitoring Times* readers heard more than three dozen different pirate radio stations this month. You can hear them, too, if you use some simple techniques. Pirate radio stations never use regularly announced schedules, but shortwave pirate broadcasting increases noticeably on weekends and major holidays. You sometimes have to tune your dial up and down through typically used pirate radio frequencies to find the stations, but more than 95% of all North American shortwave pirate broadcasts are heard on **6925 kHz**, plus or minus 30 or 40 kHz.

**Ann Hoffer Radio-** Ann remains one of the few active female pirates. Her music consists of her own cover versions of rock hits by other artists. (None known)

**Barnyard Radio-** Chuck Manson's new pirate has transmitted lengthy productions featuring noises from barnyard animals. The news is that they now have an address and they are QSLing, as we see here this month. (*barnyardradio@gmail.com*)




**Blue Ridge Radio-** This new station plays Appalachian music, allegedly from a location in the Blue Ridge Mountains of Virginia. (*blueridgeradio@gmail.com*)

**Captain Morgan-** If you hear rock music mixed with audio from the old Twilight Zone TV station, you are probably listening to this pirate. (None, says to send loggings to the Free Radio Network web site)

**Channel Z Radio-** Rock music is their staple format, but they also emphasize pirate radio advocacy and technical radio experimentation. (*channelzradio@gmail.com*)

**Dead Cat Radio-** The rock music on this station is combined with meowing cats that appear to be very much alive. (*cattus.mortuus@gmail.com*)

**Gypsy Radio-** This new one features accordion music from a pirate whose wife is named Olga. (*piratepolkaradio@gmail.com*)

**Grasscutter Radio-** They feature rock music, not seminars on how to mow the lawn. (*grasscutterradio@yahoo.com*)

**KPR-** They broadcast oldies rock music with a "We Rock the Rockies" slogan. (None known)

**Liquid Radio-** An eclectic rock and dance music format makes them different from other pirates and from almost all licensed radio stations. (*wwrbfm@gmail.com*)

**MAC Shortwave-** Paul Star's realistic replica of the old top 40 radio format is sometimes supplemented by a young boy, Ultraman, who is becoming a prominent pirate radio personality. They use the old Radio Prague interval signal to precede their own broadcasts. (*macshortwave@yahoo.com*)

**Mars Message-** A pirate has been sending messages, allegedly from Mars, warning people from Earth to stay away. (None; no maildrop on Mars)

**Mystery Radio-** During the summer it is increasingly difficult to hear Europirates in North America around 2100 UTC, but, on weekends around local sunset near the east coast on 6220 kHz, some are still hearing this one. (*radio6220@hotmail.com*)

**North Sea Radio-** Apparently a new one, this station claims to be "the worst pirate in the world." It does not seem to have an association with the historic Europirate of the same name, but instead seems to be related to Northwoods Radio. (*northwoodsradio@yahoo.com*)

**Northwoods Radio-** Jack Pine Savage's rock music broadcast "from the Great Lakes" is distinctive because of his "loon call" interval signal. (*northwoodsradio@yahoo.com*)

**#1 Weekend International Shortwave-** This new rock music station has an unusual name. (None announced)

**Radio Free Euphoria-** Their marijuana advocacy programming is mixed with humor from Captain Ganja. (Belfast)

**Radio Gaga-** Their announcer Uncle Bob programs rock and rap music. (*popeonthepoint@gmail.com*)

**Radio Jamba International-** Rock music and pirate discussions are their format, sometimes via a **WBCQ** relay. (Belfast)

**Radio Josephine-** They are a new pirate where themes involving women dominate both the music playlist and the discussion. (*radiojosephine@gmail.com*)

**Radio is My Friend-** The strange saga of Graham Conners, who is in the Cherokee mental asylum because he killed Abigail Walters, is the central focus of this station. Conners uses radio as part of his therapy. (*cherokeemental@yahoo.com*)

**Random Radio-** This one is an appropriately named pirate, with a musical format that varies on a random basis from broadcast to broadcast. (None, asks for reports to the Free Radio Network web site)

**Special Ed-** Ed is not noted for his analytical ability, but he states his views on the air anyway. (Unknown)

**Sunshine Radio-** Unusually, we have logs of two female pirate radio operators this month. This one is affiliated with Grasscutter Radio. (*grasscutterradio@yahoo.com*)

**Swine Flu Radio-** This is another one that is new this month. They feature rock music, with little medical commentary. (None known yet)

**Sycko Radio-** This veteran station transmits rock music shows, and it also sometimes relays other pirates. (*syckoradio@yahoo.com*)

**Thinking Man Radio-** Rock music, thinking, and historical commentary are featured on this relatively new pirate. (*Thinkingmanradio@gmail.com*)

**Voice of Doom-** We know little about this one, which has mainly been heard in QSO conversations with other pirates. KZSU-FM in Stanford, CA used to do some programming under this name, but it's unclear if the pirate is associated with that. (None known)

*Continued on page 61*

*T.J. "Skip" Arey, N2EI*
*tjarey@monitoringtimes.com*

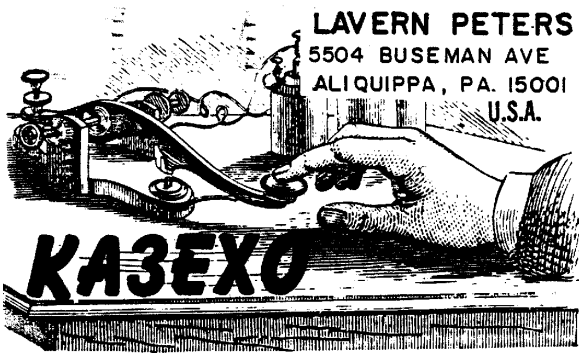
# First Contact

I heard something on the 40 meter CW band the other night that I have not heard in a very long time. I answered a CQ from a station and he sent back "QRS OM, THIS IS MY FIRST CONTACT." I was blown away! In this world of No Code licensing, there was actually a ham who made the decision to take his first foray into the ham radio world just like we did it in the old days, pounding brass on 40 meters. Well, you can be sure that I cranked back my speed to a reasonable 5-7 WPM and had a nice long ragchew with this new ham. During my thirty plus years at the key (oh sure, at the mic sometimes, too), I have had the distinct honor of being able to be First Contact for quite a few folks.

I still remember my first contact like it was yesterday. Come to think of it, it occurred on a hot July day only a few kHz from where I worked the ham I mentioned above. I sent out a shaky CQ with my "Deluxe" Radio Shack Hand Key. (It had ball bearings and everything!) My transmitter was a second-hand-or-more Heathkit SB-400 with the matching Heathkit SB-300 receiver. Very high style for a Novice operator back in those days. All this classy gear was feeding a 40 meter dipole no more than 20 feet off the ground strung between two shaggy Swamp Maples in my mother's back yard.

I sent CQ a few times and then I heard "WN2GHA DE KA3EXO GE OM BK." I must have jumped three feet straight up in the air. *Now what?! What do I do?!* Somehow, I got my heart back in my chest and my head screwed on straight and worked my way forward to have my first QSO with "Pete" Peters. He was running a Heathkit HW-101, also to a low-strung dipole. He was very patient with me and gave me lots of fills.

A few days later I got that *first* QSO QSL card in the mail. I was a very happy puppy. And the rest, as they say, is history. I have books full of QSL cards from hams all around the world, but that first contact is still etched in my mind. I know it is the same for the rest of you folks, regardless of if it was CW, phone or even a digital mode. You never forget your first contact!



*Uncle Skip's First Contact*

Now I know some of you folks reading this column are new to amateur radio and are getting ready to make your first contact. I would like to give you a little advice from someone who has been there. I also have a few words to say to you experienced Ops about how to help new folks when you hear them on the air. There are two sides to any First Contact and a little bit of forethought can make the experience great for the hams on both ends of the signals.

## ❖ Your First Time on 2 Meters

I will start here, because the majority of newly minted hams will more than likely have their first on air contact through a local repeater system. To avoid making this a white knuckle experience, let's go over a few basics.

The first thing you will want to do is make sure your equipment is working properly. Assuming, for a minute, that you are using a "handi-talkie," make sure your battery is fully charged. While it is charging, *read your manual*! You will want to make sure you understand the basic operation and frequency control settings. More than one ham's first attempt to talk on 2 meters was thwarted by having the Frequency Offset setting in the wrong position. Instead of keying up the repeater, you end up 600 kHz in never never land (and possibly out of band).

Okay… All charged up and read up? Good! Tune to a local active repeater and *listen, listen, listen*! Pay close attention to the operating practices and style of the folks on the machine. Listen to see how people acknowledge each other and how new people enter the conversation. Normal procedure is to accept new calls during breaks in the QSO. Listen to the way folks accomplish this.

When you are ready, all you have to do is key the mic and drop your call. For instance, at a break in the conversation you might simply say, "THIS IS N2EI, NAME IS SKIP, GOOD EVENING," and that should get you into the mix. Or, perhaps you will hear a lone call such as, "THIS IS WB2KKS LISTENING." You could respond by saying, "WB2KKS, THIS IS N2EI, NAME IS SKIP, GOOD EVENING."

Once the conversation begins or you are invited into the group, do not be afraid to let folks know this is your first time on the air. I am confident that once folks know this is your first contact, they will be happy to work through the contact with extra care and consideration. If you err in some way, you will receive some manner of correction. Take this in the spirit it is given. Folks want to help you be the best ham you can be.

Don't forget to ID at least every 10 minutes. When you are done, be sure to acknowledge and thank everyone in the contact. Don't forget to sign off correctly with "N2EI, CLEAR." Good radio practice is always the order of the day.

## ❖ Phone HF First Contact

Technician Class folks can operate phone in the 10 meter band. Here, the most likely way to get going would be to answer another station's CQ call. You might hear, "CQ CQ CQ, THIS IS WB2KKS CALLING CQ AND STANDING BY." Your response would be "WB2KKS, THIS IS N2EI, GOOD EVENING. HOW COPY? OVER."

Assuming you can hear one another (unfortunately a big assumption at this all too long Solar Minimum), the conversation will proceed from there with exchange of Frequency Report, QTH, and Name. You might want to make yourself up a 3x5 card with this basic exchange on it to use as a cheat sheet to get you through those first nervous moments.

Again, good manners and operating procedures will go along way. Never be afraid to ask for help.

## ❖ CW HF First Contact

Okay, so let's say you may be a freshly licensed ham, but you have the urge to kick it off Old School like that ham I mentioned at the beginning of this article. Technician Class folks can operate on the 80, 40, and 15 meter HF bands using Morse code now with no code test requirement. Good on you and welcome to the CW world!

Let's start with where to hang out. I would suggest listening in around the F.I.S.T. CW Club calling frequency 7.058 and 3.558 kHz or the Straight Key Century Club calling frequency 7.055 and 3.550 kHz. You have heard me men-

tion both of these organizations in past columns. I suggest these as good First Contact locations, because both organizations have a stated goal of helping new folks develop as CW operators. While you will be welcomed anywhere in the band, these folks are standing by waiting to help you out.

Before you "go live," you will want to practice a bit with a code oscillator to get the feel of your key and get a good sense of your sending speed. Also review the more standard "Prosigns" used in CW operation:

QRL? = Is this frequency in use?
K= over
BK = back to you
SK = clear

Listen for a clear frequency and send "QRL? DE N2EI" a few times to make sure nobody is using this spot on the band. Only then should you send CQ. Most folks send a 3x3 call: "CQ CQ CQ DE N2EI N2EI N2EI K." Stop and listen for a good 30 seconds or so before resending. If you are using a separate receiver or your transceiver has Receiver Incremental Tuning (RIT), check up and down a few kHz to make sure somebody isn't calling back a bit off your signal. Your sending speed will be a clue to how fast the other station will usually come back to you, so be sure to take it slow at first. If you need to send QRS (send slower) don't be afraid. Most Ops will be happy to crank it down to have a QSO with you.

If, instead, you are responding to another station's CQ, your usual response will be something like: "WB2KKS DE N2EI N2EI N2EI K." Even experienced Ops aren't always as ready to hear someone come back as you might think. Sending your call several times gives everybody a chance to get organized for what is to follow.

## ❖ Notes to Experienced Ops

Now for you experienced Ops: *Remember your first time!* I still recall how nervous I was and how much I really appreciated the kindness and patience that Pete KA3EXO showed me during my First Contact.

That new ham is looking to you for guidance into the greatest hobby in the world. Show them your best skills. Lead by example. That goes for second, third, etc. contacts as well. Helping new hams become good hams is our duty and responsibility to the hobby.

Also for you experienced Ops who have the honor of helping a new ham out with his or her First Contact, while it is a general rule that folks do not exchange QSL cards for routine repeater contacts, I think a true First Contact deserves a card exchange at the very least. But there is an even better way to acknowledge a new ham's first on air experience. Web on over to **www.arrl.org/FandES/ead/award/certificate/1contact.html** and fill out the form to have the ARRL Issue a First Contact Certificate. You will be giving that new ham his or her first piece of "wallpaper." And the experience will never be forgotten, thanks to this fine commemoration.

## ❖ On the Ham Bookshelf

EXPERIMENTAL METHODS IN RF DESIGN
By Wes Hayward W7ZOI, Rick Campell KK7B and Bob Larkin W7PUA
ISBN# 978-0-87259-923-9
ARRL Order # 9239
$49.95
The American Radio Relay League
225 Main Street
Newington, CT 06111-1494
www.arrl.org/shop
1-888-277-5289

For many years, the book that gave aid and comfort to dedicated home builders and experimenters was *Solid State Design for the Radio Amateur*. That book was put together by Wes Hayward W7ZOI and the late great Doug DeMaw W1FB. You should see my copy! The pages are worn thin and covered with solder burns.

But, as good as this book remains, it became very long in the tooth in terms of technology since its 1977 first edition. So hams dedicated to design and experimentation were pleased to see *Experimental Methods in RF Design* come along in 2003. This book updated the work of Wes W7ZOI and Doug W1FB, acquainting a new generation to newer technologies to build great amateur radio projects. At the risk of repeating myself… You should see my copy! The pages are worn thin and covered with solder burns. Get the picture?

So here we are in 2009. Technology has moved on a bit further. But thanks to the work of Wes W7ZOI, Rick KK7B and Bob W7PUA, we did not have to wait 26 years for an update. This "Revised First Edition" of *Experimental Methods in RF Design* brings hams an up-to-date resource for the workbench. Every aspect of radio design is covered in detail and explained by the authors in a manner that informs and teaches.

As I said about the original edition, if a ham was to work through the information and was to build the projects presented in just the first chapter of this book, they would possess a body of knowledge that would put them head and shoulders above many hams on the air today. And just think, there are 11 more chapters chock full of information that build on these basics. I can't wait to wear this copy out like I did the earlier works. Highly recommended!

Have fun folks! I'll see you on the bottom end of 40 meters. First Contacts always welcome!

### UNCLE SKIP'S CONTEST CALENDAR

**RAC Canada Day Contest**
July 1 0000 UTC - 2359 UTC

**MI QRP July 4th CW Sprint**
July 4 2300 UTC - July 5 0300 UTC

**FISTS Summer Sprint**
July 10 1700 UTC - 2100 UTC

**North American QSO Party RTTY**
July 15 1800 UTC - July 16 0600 UTC

**CQ Worldwide VHF Contest**
July 18 1800 UTC - July 19 2100 UTC

**RSGB IOTA Contest**
July 25 1200 UTC - July 26 1200 UTC

*Outer Limits continued from page 59*

**Voice of KAOS-** TV show audio, rock music, and political discussions are heard here. (*voiceofkoas@gmail.com*)
**Voice of Spike-** This new pirate features classic novelty music by Spike Jones. It claims to be the only such radio station in the world, either pirate or licensed. (None announced)
**Voice of the Runaway Maharishi-** This veteran drug advocacy pirate is back on the air. (Belfast)
**WBNY-** Commander Bunny's clandestine station parody of the Rodent Revolution has evolved into perhaps the most influential pirate on the air today. (Belfast and *rodentrevolutionhq@yahoo.com*)
**WEAK-** The new version of these veteran pirate radio call letters is still active. The old **WEAK** from Leonard Longwire was also active on New Years Day. So, we have two pirates using the same call letters (now using *weakradio@gmail.com*)
**WFUQ-** The semi-profane emphasis of this rock music pirate is not a typo. (None)
**WMPR-** This mysterious and widely heard "dance party" techno rock pirate is still active. (None, known to only QSL occasionally at the Winter SWL Festival)
**WNKR-** Western North Kent Radio, an active Europirate, continues to get North American pirate relays of its programming. (*wnkrsw@gmail.com*)
**Wolverine Radio-** Rock music is their normal format, but sometimes they feature other genres. (None)
**WTCR-** The musical fare on "20th Century Radio" still varies, with tunes featured from all decades of the last century. (Belfast)

## ❖ QSLing Pirates

Reception reports to pirate stations require three first class stamps for USA maildrops or $2 US to foreign locations. The cash defrays postage for mail forwarding and a souvenir QSL to your mailbox. Letters go to these addresses, identified above in parentheses: PO Box 1, Belfast, NY 14711; PO Box 109, Blue Ridge Summit, PA 17214; PO Box 146, Stoneham, MA 02180; and PO Box 293, Merlin, Ontario N0P 1W0.

Some pirates prefer e-mail, bulletin logs or internet web site reports instead of snail mail correspondence. The best bulletin for submitting pirate loggings with a hope that pirates might QSL is now the e-mailed *Free Radio Weekly* newsletter, still free to contributors via *freeradioweekly@gmail.com*. A few pirates will sometimes QSL reports left on the outstanding Free Radio Network web site, at **http://www.frn.net**. *The ACE*, a formerly widely read print bulletin, now has a good loggings section and a valuable archive of *Free Radio Weekly* issues at www.theaceonline.com/

## ❖ Thanks

Your loggings and news about unlicensed broadcasting stations are always welcome via 7540 Highway 64 W, Brasstown, NC 28902, or via the e-mail address atop the column. We thank this month's valuable contributors**:** Brian Alexander, Mechanicsburg, PA; Dave Balint, Wooster, OH; Artie Bigley, Columbus, OH; Jerry Berg, Lexington, MA; Rich D'Angelo, Wyomissing, PA; Ragnar Daneskjold, North America; Gregory L. Dome, Onalaska, TX; Bill Finn, Philadelphia, PA; Harold Frodge, Midland, MI; Captain Ganja, Belfast, NY; William T. Hassig, Mt. Prospect, IL; Vashek Korinek, South Africa; Kracker, Belfast, NY; Ed Kusalik, Camrose, Alberta; Chris Lobdell, Tewksbury, MA; Leonard Longwire, Belfast, NY; Greg Majewski, Oakdale, CT; Larry Magne, Penns Park, PA; Bill Matthews, Columbus, OH; C. E. Mental, Chelmsford, MA; Ed Moor, Chelmsford, MA; Don Moore, Davenport, IA; Mike Rhode, Columbus, OH; Lee Silvi, Mentor, OH; and Joe Wood, Greenback, TN.

*Clem Small, KR6A*
*clemsmall@monitoringtimes.com*

# Something Very Different in Antennas!

You've probably heard the idea that, for receiving, an antenna captures energy from incoming radio waves. Perhaps you've also heard that, for most antennas, this radio-frequency (RF) energy oscillates electrically in or on the antenna. However, as this electrical oscillation takes place within the antenna the RF energy doesn't cause the antenna to physically move significantly.

Well, science marches on, and this month we discuss an antenna so small, its mass is so low, that incoming radio waves tuned to that antenna's resonant frequency actually make the antenna vibrate mechanically! Let's now take a look at some small and smaller antennas.

## ❖ Small Antennas

Years ago I ran a contest in this column to find the world's smallest antenna. One entry was a paper clip which a ham had used as an antenna for two-way communication on the shortwave band! However, the smallest entry was a metal band around a small capsule-sized transmitter which was about .25 in in diameter. The capsule was designed to be carried by executives or political persons who run a risk of being kidnapped. When swallowed, the capsule would be activated by stomach acid, and its signal could be tracked from three to five miles away. But that was several yesterdays ago.

## ❖ Enter Nanotechnology

Today, things are quite different and the antenna on that capsule-sized transmitter would seem gargantuan compared to some antennas that we have now. There are a number of antennas which are many orders of magnitude smaller than that pill antenna.

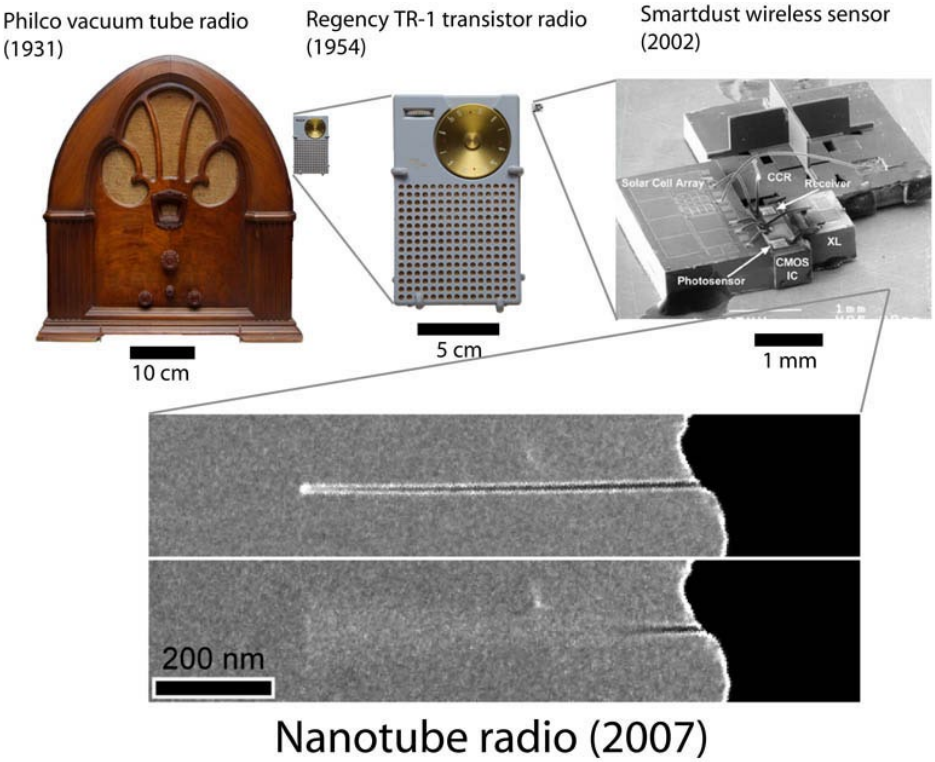
As you may know, there has been considerable research into the world of nano technology in the past several years, and interestingly enough, various tiny nano antennas have been discovered. Some of these are cited in "Some Interesting Antenna-Related Web Sites" box in this column. Perhaps the most-interesting nano antenna is one envisioned and brought to reality by University of California, Berkeley physicist Alex Zettl and his co-workers.*

## ❖ Zettl's Antenna

Zettl's antenna (bottom of fig. 1) is impressive for several reasons: First, it is so small that it could fit within a living cell: it's about the size of a virus. In addition to acting as an antenna, it essentially performs all the functions of a radio receiver, including tuning to the frequency on which reception is desired, amplification of the signal to be received, and demodulation (extracting the music, code, or voice from the wave): It is a complete radio receiver!

As mentioned above, rather than simply conducting oscillating electrical energy, it vibrates mechanically in response to an incoming radio wave. There are two images of this antenna labelled "nanotube radio (2007)" at the bottom of fig. 1. The top image shows the antenna when it is not receiving a signal, and the lower image shows the antenna when receiving a signal. As the figure shows, the antenna vibrates when it is receiving and is thus seen as a blur. Also on Fig. 1 we see a size comparison of radios from the early years of radio on to the present nanoradio.

Potential applications for antennas like Zettl's include "hearing aids, cell phones and iPods small enough to fit completely within the ear canal." Even radio-controlled robots that can travel our blood streams seem within reason. Also insect-sized robots that could carry sensors to detect dangerous-gas, or carry tiny cameras to help rescue efforts in situations such as collapsed mines.




***A size comparison between older radios across the years, and the new nano-antenna radio. From* www.physics.berkeley.edu/research/zettl/projects/nanoradio/radio.html. *Used with permission.***

## ❖ Be the First Kid on your Block to Hear a Nano Radio!

If you'd like to hear one of these nano-antenna radios receiving and playing an Eric Clapton song, then visit the "nanotube radio site" found in the "Some Interesting Antenna-Related Web sited" box in this column. It's not Hi-Fi, but the results are impressive for an antenna so small we can't see it with our naked eyes! A video of this is available on the "nanotube radio site" in the "Some Interesting Antenna-Related Web Sites" box.

## ❖ Other Tiny Antennas

Workers at the Idaho National Laboratory, at Microcontinuum Inc., and at the University of Missouri are producing antenna arrays that convert infrared energy from the sun or from the earth's heat into electrical power. Infrared waves are electromagnetic waves, just as are radio waves; however, they are extremely short compared to the wavelengths used for radio communication.

For this reason, the size of each spiral antenna utilized in these arrays is extremely small: about

**This Month's Interesting Antenna-Related Web site:**

A definition of nanotube antennas:
**http://whatis.techtarget.com/definition/0,,sid9_gci1029004,00.html**
Nanotube radio site:
**www.physics.berkeley.edu/research/zettl/projects/nanoradio/radio.html**
Nano-antennas in infra-red wavelengths:
**http://jcwinnie.biz/wordpress/?p=2759**
More on infrared antennas for solar collecting:
**http://newenergyandfuel.com/http://newenergyandfuel/com/2008/01/08/a-nano-technology-payoff-that-should-be-huge/**
Optical antenna:
**www.nanowerk.com/news/newsid=798.php**

the width of a human hair! One of their antenna arrays has 10 million infrared antennas within a 6-in circle! Contrasted to traditional solar cells, which are less than 20% efficient at converting the sun's energy to electrical energy, these new antennas are as much as 80% efficient. Obviously these arrays appear to herald a means of producing extremely-economical electrical power.

Workers at Harvard University have developed a "plasmonic laser antenna" which combines a laser with an antenna. This antenna, which is only a few-hundered nanometers across, functions in the optical wavelengths which are, of course, part of the electromagnetic spectrum, as are radio waves. The tiny size of these optical devices gives greater resolution than does previous optical technology. This will likely lead to greater storage density in optical storage devices such as CDs and DVDs.

Ken Crozier, one of the researchers working on these antennas says: "Eventually, we envision the laser integrated into new probes for biology like optical tweezers – which can manipulate objects as small as a single atom."

## ❖ And So

Thinking of the progressive reduction in size that scientific research has made possible for devices in electronics and for other technologies reminds me of an interesting saying a friend of mine told me years ago. It goes like this: "It seems that we learn more and more about less and less until we are soon going to know practically everything about nothing!"

If so, it would seem that the "nothing" will most likely have some very interesting things to offer technology.

**The World's Smallest Radio, Scientific American, page 40-45, March 2009.*

## RADIO RIDDLES

**Last month:**

I asked: "There were many sources of the noises picked up by the Big Bang researchers discussed above. Do you suppose that it's possible that one source of noise could have been the antenna itself? That is, could it be that an antenna generates within itself some of the noise for which the researchers had to account?"

The answer is "yes." All conductors, resistors, antennas, etc. that are not cooled down to absolulte zero generate a small amount of electrical noise. Fortunately for us, the level of this antenna-generated noise is so low that, in relation to most other sources of electrical noise in radio communication, it is of no consequence. For this reason we are concerned with it only when dealing with extremely weak signals: for example listening to the residual noise of the Big-Bang as we disussed last month.

**This Month:**

There's the old question that goes something like: "If a tree fell in a forest, and no one was around to hear it would it still produce a noise?" Well, in a similar vein, if an antenna were far off in outer space, and no transmitter or receiver was hooked up to it, would it still receive and/or transmit electromagnetic waves (radio waves)?

You'll find an answer to this month's riddle, another riddle, another antenna-related web site or so, and much more, in next month's issue of *Monitoring Times*. 'Til then Peace, DX, and 73.

*Marc Ellis, N9EWJ*
*marcellis@monitoringtimes.com*

# Recapping the S-20R

## From the Readers

***Perry Crabill***, W3HQX, who provided me with the locking ring removal tool mentioned in last month's article, writes:

*In your article about the S-20R you are working on (MT May 2009) you mention that it has cabled wiring with an odd, fuzzy-looking gray-colored insulation. I wonder if it was wired with "pushback wire." This was wire with a waxed cotton insulation that didn't have to be stripped to bare the wire for making a connection. You just pushed the insulation back to expose enough of the end to do the job. I believe that Belden provided it under that name. I used pushback wire for a number of projects when it was available, probably even before WW-II.*

I checked and Perry is absolutely right. It *is* pushback wire – just as he describes it. And I'm so happy to find that out. I had a suspicion that the fuzzy look was caused by mold, and my hands felt dirty every time I worked on the set. Now I know that the effect was only psychological.

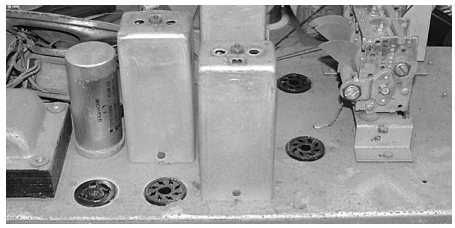
I also had an interesting note from Bob Kulow, WA2UEH, about a switch on our previous project (Globe Scout transmitter) that had me confused for awhile because it worked opposite to what its panel labeling indicated. This was a factory-wired transmitter that showed no signs of owner modifications. Bob writes:

*Your problem with the meter switch might be as simple as Globe changing the maker of the switch. Some toggle switches work "backwards." The contacts that are closed are opposite the position of the handle. Other switches work "forwards" so the contacts that close are the same position as the handle. I learned this long ago when a problem like yours crept up. I now know to check every toggle switch with an ohmmeter to determine whether it is forwards or backwards.*

I think it's likely that Bob is correct – as far as it goes, but it doesn't explain how such an egregious fault escaped factory final testing. My theory is that it *was* discovered, but only after a great many units were built. And rather than rewire, the factory may have somehow decided it was easier to make a pasteover correction to the panel labeling. Over the years, the correction could have dried out and fallen off, exposing the original "backwards" labels.

## And Now – Back to the S-20R

At the end of last month's work session, we overcame some problems with broken knob setscrews and frozen switch retaining rings – thereby paving the way for the removal of the front panel/cabinet assembly from the chassis. At last, the naked chassis was sitting on the bench in front of me and I could begin the restoration. Since the chassis was covered with a thick coat of (probably) basement dust, the first step was to clean it.



***On receipt, the S-20R chassis was covered with a thick layer of basement dust.***

Cleaning was accomplished with a soft rag dampened in mineral spirits. And though the dust wiped off easily, the finish that was revealed was covered with dark spots caused, I suppose, by degredation of the plating. But there was no outright rust anywhere, which suggested that the receiver had at least been stored inside – not in a shed or garage.

I was pleased that the dust had not settled between the plates of the variable capacitor, requiring its removal for cleaning. While pulling a capacitor is not the toughest job in radio restoration, it does involve disturbing r.f. connections and using a humungous soldering iron to unsolder heavy ground braid from the chassis. I got my iron from a garage sale, and though the wattage label had fallen off, its huge tip must be 3/4" in diameter where it screws into the iron and I have yet to see a braid that it can't make short work of.

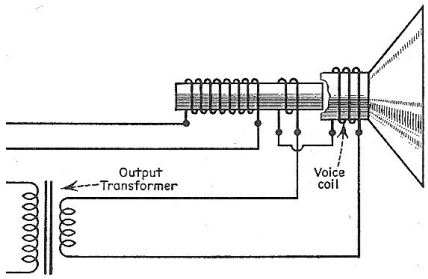
With the top of the chassis cleaned off, the next step was to remove the speaker, which had been removed from the front panel but was still attached to the chassis by its leads. I didn't want the speaker flopping about and possibly getting torn as I moved the chassis this way and that during the recapping that was to come. So, one by one, I removed the several wires from the chassis, attaching a tape label to each to indicate its connection point.

***After cleaning, the chassis proved to be covered with spots where the plating had been attacked. But at least there was no rust.***

## Speaker Puzzle

In disconnecting the speaker, I noticed that the wiring was odd. There were six leads instead of the expected four and two of them were connected to the same point under the chassis. Examining the speaker/output transformer assembly, I saw that two of the leads came from the output transformer and four from the field coil.

In speakers of this era, produced before powerful permanent magnets had become available, the necessary magnetic field was produced by an electromagnet called the "field coil." This coil was usually energized by doing double duty as the power supply filter choke.




***In this illustration, the rearmost coil on the speaker is the field coil. Directly in front of that is the hum bucking coil, which is in series with the output transformer secondary and the voice coil.***

In some speakers, such as this one, the field coil had an extra winding called the "hum bucking" winding. This was intended to be connected in series with the output transformer secondary and speaker voice coil in such a manner as to produce a hum in the voice coil out-of-phase with the hum introduced from the secondary of the output transformer. The result was that the hum was largely suppressed.

The two extra leads on our coil had to be a hum-bucking winding. But the normal connections for this winding (Fig. 1) are all made within the speaker/output transformer assembly. There would be no reason to bring these leads to connections under the chassis.

I looked at several different schematics for the S-20R without finding any that showed a

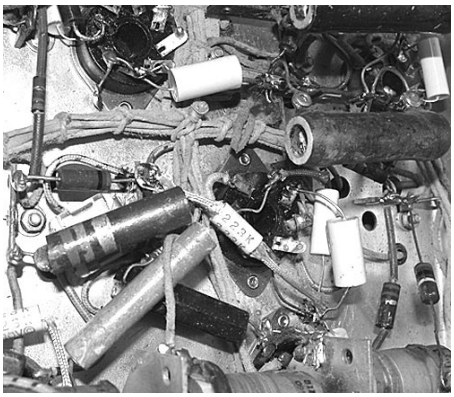
hum bucking winding on the speaker. My extra "parts set" S-20R speaker didn't have a hum bucking winding either. It took a while to dawn on me, because speakers so rarely fail, that this had to be a replacement, and an amateurishly-wired one at that!

Comparing the mounting brackets on the removed speaker with the one on the parts set clinched the deal. The latter were firmly riveted in place, while the former were poorly fitted and loosely screw-attached. On reassembly, I will definitely substitute the speaker from the parts set.

Perhaps the same event, probably a capacitor failure, that triggered the 80 rectifier replacement I had noticed in an earlier column had also burned out the speaker field coil. After all, the coil – as mentioned – also serves as a filter choke in the rectifier circuit.

## ❖ Recapping the S-20R

Having made wholesale capacitor changes on many different chassis over the years, I've encountered a remarkable variety of work environments. Sometimes the parts are nicely laid out so that one can almost visualize the schematic by looking at them. Sometimes the components look almost deliberately placed one on top of the other with leads so short that good components might have to be destroyed to get access to bad ones. Such is the case in our S-20R, where also much of the wiring is cabled, making circuit tracing all but impossible.



***By the end of this work session, all of the paper caps had been replaced with modern polyester film units.***

Yes, I'm aware of the desirability of short leads, especially in certain circuits, but some designers seemed to have a total disregard for the possible necessity of later maintenance. Maybe they thought that all those cheap foil and waxed paper capacitors would last forever, or maybe they thought – quite reasonably – that the radios would become obsolete before the parts failed. Who would have thought that there would later emerge a large group of radio hobbyists that would derive pleasure and satisfaction from coaxing the old behemoths back to life well over a half-century after their manufacture?!

Apart from general differences in parts layout, I've also noted different styles of assembly technique – particularly in the attachments of leads to lugs. One extreme was found in a communications receiver by a major manufacturer. In that set, component leads were simply inserted straight in and then soldered – in total defiance of the conventional wisdom that leads *must* be well secured mechanically before being soldered. Recapping that one was a piece of cake!

More often, though, the leads are inserted into the lugs and bent hairpin style. If they do make a complete circle, the lead goes around the whole lug, and it's easy to unbend it with a sharp tool while applying the soldering iron. But our S-20R was assembled to tighter standards.

At the beginning of our restoration I was surmising that this set might be among the batches made for the military – as evidenced by the fact that virtually all the tubes bear military markings. Maybe that's why many of the leads were twisted into a complete, tight circle encompassing just half of the lug. I have to admire the swivel-wristed assembler that accomplished these feats, but she certainly made my job a lot tougher.

Besides being buried by other components, some of these capacitors were half buried in the shielding compartments that were obviously installed only after the caps were put in. In all cases but one, luckily, only the ground point of the cap was inaccessible and I could reach the "hot" connection. After removing the bad cap, I could install the replacement by choosing a different ground.

I eventually managed to replace all but one of the paper caps. That one is at very bottom of the shielded oscillator compartment. Maybe it could be changed out by a surgeon using laproscopic techniques, but I'll just have to keep my fingers crossed and hope it's still good!

## ❖ Why Do We Do It?

You may wonder, after all the complaining I've done about this project in the last couple of issues, why anyone would get so wrapped up in bringing one of these old sets back to life. Some of us are motivated by nostalgia – we loved these radios when we were younger – and some of us like a challenge and find the process exciting. I'm in both of those categories. Another group I occasionally hear from includes those currently working as engineers. One such person told me that he finds rehabbing the old gear relaxing after his daily work with solid state computerized equipment.

I heard one of the most eloquent statements along these lines while I was watching an interesting video on cable describing the rehabbing of a vintage Russian tank. It was made by a person described as: "*. . . a Project Manager in Silicon Valley at one of the most successful and celebrated internet companies – a wizard at restoring outdated technology.*"

During his interview this individual said: *"The vacuum tubes are glowing; you can measure capacitance, resistance, inductance. You can't do any of that with computers. You can actually get your hands on the electronics and the technology of these radios that were made in the 1930s and 1940s, and that's powerful for me."*

See you all next time, when we'll find out what new curves this ornery old radio will throw at us.

**MT READERS ONLY**

To access the restricted website for the month of July, go to **www.monitoringtimes.com**, click on the key, and when prompted, enter "**mtreader**" under the user name. Your password for July is "**arch**" – Check in each month for new material!

# MFJ-269 HF/VHF/UHF SWR Analyzer

Review by Bob Grove, W8JHD

At first glance, one would logically assume that the MFJ-269 model test equipment was specifically an antenna analyzer, but it's actually quite a flexible instrument with applications beyond that apparent limitation.

Enclosed in a durable aluminum case, the instrument features a cluster of displays and controls. Two analog meters announce the SWR of the circuit under measurement and the complex impedance. A band switch selects the desired frequency range while a tuning control sets the specific frequency. Analytical details are presented on an LCD panel.

A MODE pushbutton progressively steps through the many test functions of the analyzer, while a GATE pushbutton determines the sampling period. These two buttons are actually dual function, providing toggle access to other, more advanced measurements.

Connections to the analyzer functions of the instrument are via a female N connector, while a separate BNC connector accepts input to the frequency counter. An adjacent grounding terminal conveniently allows attachment of a component under test between it and the antenna connector.

The analyzer is powered by 10 (yes, *10!*) internal AA cells; for long-term test-bench applications, a convenient power jack allows attachment of an external 12 VDC supply (not provided). Some operations require current on the order of 250 milliamperes, so the use of an external power supply is a good idea for prolonged applications. To its credit, a battery-save mode can be implemented for periods of disuse while the instrument is switched on.


## So, just what does it do?

The MFJ-269 is an RF lab in a box. For antenna system applications, the unit will display SWR, total complex impedance, resistance, composite inductive/capacitive reactance, resonant frequency, bandwidth limits, and operating frequency.

Useful additional applications include transmission line loss, RF filter skirts and attenuation, trap and tuned circuit resonant frequencies and approximate Q, capacitor and coil/choke value determination including self-resonant frequency, and oscillator frequency measurement.

The LCD panel can directly display measurements of capacitance (pF), inductance (uH), electrical lengths of transmission lines (feet or degrees), feedline loss or return loss (dB), impedance (ohms or phase angle degrees), resistance and reactance (ohms), frequency and resonance (MHz), and SWR ratio.

Some of these tasks may seem like a large order for a single instrument; after all, why would laboratories spend tens of thousands of dollars for equipment that does far less? Simply said, this isn't intended as a tightly-specified laboratory standard; it's a handy tester for the ham shack or electronic experimenter who needs to check components for correct performance. Approximations often work well in such applications, and many values are quite close to what may be seen on a vastly more costly lab instrument.

## Let's give it a test

With a workshop full of components and test equipment, I found the temptation to give this instrument a real workout irresistible.

*Frequency counter:* First, I connected it to an external signal generator; the frequency counter function tracked continuously from roughly 2-180 MHz as specified in the manual; but the higher the frequency, the more drive is required for a response from the counter. I was able to get it to about 300 MHz, but the drive levels had to increase substantially and I didn't want to damage the input circuitry.

*SWR meter:* It must be remembered that this is not a device that connects between a transmitter and an antenna (which would destroy it); it generates its own RF output signal to measure the impedance match to any external circuit.

Antenna enthusiasts have learned that any antenna measurements to be performed accurately *must* be done at the antenna feedpoint, not through a random length of coax which alters the reading. While it is possible to make an antenna measurement remotely through an electrical half-wavelength of coax, other variables have to be taken into consideration, like line loss and impedance uniformity.

I decided that a commercial dummy load would suffice as a satisfactory test element; it's small, has predictable parameters, and can be mounted right on the instrument's antenna connector. Over the analyzer's entire frequency range, the DC resistance was very close to the design spec of the load, and the SWR measurement was right on cue as well.

*Capacitance:* Because of stray inductive effects at higher frequencies, it's best to use the lowest frequencies to check capacitors, and connect the capacitor right at the N connector (see illustration). With the frequency set around 2 MHz, I found appropriate readings from a few picofarads up to nearly 10,000 picofarads (0.01 microfarad). Naturally, lead length increases the apparent inductance.


If you make the measurement at the end of a length of coax, you must subtract the coax distributed capacitance from the displayed value. The coax capacitance is revealed on the display before connecting the capacitor.

*Inductance:* While inductance (typically from about 0.1 to 120 microhenries) can be calculated by the instrument, it's pretty tricky. I selected several inductances of known value and successively tested them, but readouts changed dramatically with frequency setting.

Generally, though, by attaching the inductor to the N connector via several feet of coax, I could get a stable reading. The adjustment was to use the lowest frequency that would produce an inductance readout, usually 2-4 MHz. If the inductance readout stayed relatively stable even while the tuning knob was turned, the inductance value was usually correct.

Consultation with the design engineer revealed that the problem was the presence of parasitic oscillations present in the signal which complicate the computed algorithm. His recommendation was to choose a suitable frequency and isolate the inductor with a half-wavelength of 50 ohm coaxial transmission line. (Don't forget to implement the 0.66 velocity factor!)

For example, make the measurements at 150 MHz with a 2.1 foot piece of RG-58/U or RG-8/U between the analyzer and the inductor (468 ÷ 150 x 0.66 = 2.06).

*Resistance:* Resistors must be measured right at the N connector to avoid reactance from coax cable. You will get reasonable readings on carbon resistors below about 200-300 ohms, but not on wire-wound resistors – remember, they are coils! Best to use your multimeter (DVM or VOM).

*Coax line loss:* While the dielectric insulation in coaxial cable is low loss, the higher the frequency, the greater it leaks signal voltages between the center conductor and the shield. The MFJ-269 injects an RF signal into the coax and measures the conductance between the center conductor and shield, converting the loss to decibels and displaying the result.

Attaching a 25 foot, unterminated length of coax to the instrument, I found that it was time to discard that old, unmarked cable! At 150 MHz, the loss was only 0.8 dB, but at 450 MHz it was 2.5 dB. I can only guess what it would be at 900 MHz! No point in keeping it around anymore unless I want to use it for an attenuator!

Has your antenna cable been in use for several years? It's time to test it for loss. Compare your results with the dB/100 ft. specification you were given for your coax. If there's a sizable increase, replace it, especially for use at upper VHF and UHF.

*Signal generator:* Although not advertised as such, I surmised that if the unit can inject selected frequencies into external components for their measurements, theMFJ-269 might make a dandy test oscillator. Sure enough, connected to a spectrum analyzer, I discovered it puts out a walloping, pulsating signal, tunable from 1.8-175 and 416-469 MHz with displayed frequency accuracy within a few kilohertz!

However, due to the fast tuning, slow drift, and presence of parasitic oscillations, I wouldn't recommend it as an on-air VFO!

## ❖ And more advanced features

For the tenacious experimenter, the useful instrument can also be used in advanced modes. The manual divides these tasks into three categories*:

(1) Magnitude and phase of load impedance; series and parallel equivalent impedances; return loss and reflection coefficient; resonance; match efficiency
(2) Velocity factor setup; distance to fault measurement; line length in degrees
(3) Characteristic impedance setup; normalized SWR impedance; coax loss

**Note: Most of the features in these three groups are available for HF and VHF only; UHF measurements are only available for return loss and reflection coefficient, match efficiency, velocity factor setup, and line length in degrees.*

## ❖ The manual

The accompanying 40-page instruction manual is much more than a list of directions; fully one-half of its contents are tutorial theory and practical applications of the instrument. Language is easy to understand, covering virtually every element of antenna design, from tuning antennas and antenna tuners, to adjusting and characterizing matching networks and their component parts, and to transmission line velocity factors and antenna polarization considerations.

There are some omissions, however, such as more specific treatment of the half-wave isolation line between the instrument and reactive components. Few experimenters (including me) would have had that intuition.

## ❖ The bottom line

While the MFJ-269 might not meet the rigid specifications of narrow-purpose laboratory equipment, I've never seen any other hobby-level piece of test gear that has so many useful functions for the radio enthusiast. It's a bargain for the experienced and technically adept antenna and RF experimenter/designer.

*MFJ-269 SWR Analyzer, $389.95 plus shipping at Grove Enterprises; also available from other MT advertisers.*

# Icom IC-RX7

By Larry Van Horn, N5FPW

First, a disclaimer: I have never been a big fan of wideband radios *per se*. I have always felt if you want a good shortwave radio, you should buy one. And if you want a good scanner, buy one of those. You won't get both in one package.

So, when I was given the Icom IC-RX7 to test, I figured I would be getting pretty much the same I have seen over the years – mediocre performance in both the HF and VHF/UHF spectrums. But, after conducting a *First Look* test of this handheld, I am pleased to announce it is one of my favorite wideband handhelds.

## Case, Controls and the Antenna

This is one nice compact handheld package. It has a slim and stylish design and has a splash resistant construction with an ingress protection code of IPX4. It measures 2.25 (W) x 3.1 (H) x 0.8 (D) inches (57 x 128 x 23 mm) – projections not included), and it weighs just 7.1 ounces (200 kg) with BP-244 and antenna attached.

The unit has a backlit, full dot-matrix display that uses an amber color backlight. The screen is a bit small and dim for my taste and old eyes, but it is capable of displaying a lot of information. One of the more unique aspects of this display are the 23 icons that are available for category programming: truck, bus, car, race car, taxi, motorcycle, train, ship, yacht, aircraft, glider, ham, ham HH, radio, TV, emergency, fire, weather, human, animal, building, house and program search. The unit has a menu screen that is used for programming values and checking on the conditions of various scanner functions.

The RX7 controls and jacks are well laid out and include a keyboard (with 4-way cursor buttons for quick navigation to menus and settings.); front panel speaker; an external 6 VDC In jack and external speaker clone jack (both with rubber covers) on the right side panel, and a multi-function control dial on the top panel.

The unit comes with a screw-on (SMA connector) whip antenna that is also located on the top panel.

## What's under the hood?

There are other controls and options that are built-in. There are built-in RF-gain control and attenuator controls; a built-in AM bar antenna; an earphone antenna function for FM broadcast reception, and an auto power save function. There are quite a few control options that are part of the software menu system (mentioned above). Some of these options include: AM and FM antenna selections, RF gain levels and attenuator on/off, auto power on/off and power save modes, dial acceleration, key lock type, CI-V settings, AF filter, and tone control (bass and treble). Tone control functions and the audio filter are available for the AM/WFM modes only.


Other notable features include high speed scan and high speed search (100 channels/sec); CTCSS/DTCS decode with pocket beep function; and a VSC (Voice Squelch Control). The IC-RX7 comes with preset memory channels for ham radio, air band, railroads, and car racing and more. You select your desired listening subject and, with the push of the "Scan" button, the unit automatically finds active channels within the selected area of interest.

The unit also has a one-touch search button. The channel mode and channel step are preprogrammed for each frequency range. Using this feature you can search for new active channels within a designated frequency range or fixed category with a push of the "Search" button. The auto memory write function automatically stores detected channels in your memory.

The RX7 has a three-level memory arrangement. The total of 1650 memory channels can be classified three different ways: by "Category" (up to 26 categories), by "Group" (up to 100) and by "Memory Name" (up to 100). An alphanumeric name of up to 16 characters may be used for each channel, and up to 6 channels can be stored per "Memory Name" heading. In addition, each "Category" can be labeled with one of the aforementioned display icons for faster recognition.

The unit can be programmed using the optional CS-RX7 software (which we did not test), and you can clone RX7 units using optional cloning cables.

**MT RATING: 2 3/4 STARS**

## What's in the box?

In addition to the handheld, accessories included in the box include a hand strap, rubber duck antenna, belt clip, battery pack (BP-244), battery charger (BC-149A or D), and a printed instruction book, plus other miscellaneous papers.

## Overall Rating and Final Thoughts

First, I found the instruction book easy to use and well laid out, something I have come to expect from Icom. Most of the operating functions used within this unit have become standard with Icom rigs over the last few years, so if you have mastered a previous Icom handheld scanner or radio, some of the basic programmed functions will be familiar to you.

Using just the whip and built-in antennas, I found overall reception good, better than most of the wideband handhelds I have tested. It has some nice functionality when it comes to frequency programming flexibility. It has a good feel when you hold the rig, good construction, and accessing the basic functions of the scanners is intuitive.

There are a few negatives and one of the big ones is the lack of trunk radio system capability. I am still surprised that some of the

**MT FIRST LOOK RATING (0-10 SCALE)**

| | |
|---|---|
| Audio Quality | 6 |
| Audio Levels | 6 |
| Backlight/Display | 6 |
| Battery Life | 8 |
| Ease of Use | 7 |
| Feature Set | 6 |
| Keyboard/Button/Control Layout | 8 |
| Overall Construction | 8 |
| Overall Reception | 7 |
| Owners Manual | 10 |
| Sensitivity (FM mode) | 7 |
| (AM and WFM mode) | 5 |
| Selectivity | 7 |

major manufacturers (such as Icom, Alinco, and Yaesu, to name a few) who cater to the scanner marketplace, still have not jumped on this bandwagon. With more and more public safety systems using this technology in today's RF environment, the lack of trunk tracking and APCO digital decoding capability weakens the feature set considerably.

Other areas which can use some improvement: the audio is tinny and somewhat weak (75mW into an 8 ohm load, versus 310 mW into a 24 ohm load on the Uniden BC396XT we recently tested). The display is hard to view in low and some bright light situations, with no built-in ability to adjust its brightness. Lighted keys would also be an improvement in most low light and night scanning situations.

The Icom IC-RX7 sells for $364.00 retail and is available at the usual amateur radio stores.

So, if you are looking for a nice analog, no trunking scanner with some HF capability that can be easily carried around, the Icom IC-RX7 will fill that niche quite nicely.

## ICOM IC-RX7 HANDHELD

### General Specifications

Frequency Range (U.S version):
0.150-823.995 MHz; 849.0-868.995 MHz; and 894.0-1300.000 MHz.
Mode: AM, FM, and WFM
Tuning Steps: 5, 6.25, 7.5, 8.33, 9, 10, 12.5, 15, 20, 25, 30, 50, 100, 200 kHz
Scan/Search Speeds: 100 channels per second/ 30 steps per second
Number of Memory Channels: 1650
Usable Temperature Range: -10°C to +60°C; +14°F to +140°F
Current Drain (at 3.0 V DC): Rated audio: 150 mA;
standby: 100 mA; and power saved: 35 mA
Power Supply Requirement: 3 x AA (R6) Ni-Cd or alkaline cells,
3.7V/1100mAh Li-Ion battery back supplied
Antenna Connector: SMA (50 ohms)
Dimensions: 2.25(W) x 3.1(H) x 0.8(D) inches (57 x 128 x 23 mm) (projections not included)
Weight: 7.1 oz. (200 kg)

### Receive Specifications (Manufacturer Supplied)

Receive System: Triple conversion superheterodyne
Intermediate Frequencies: 1st: 429.1 MHz, 2nd: 19.65 MHz, 3rd: 450 kHz
Sensitivity (except spurious points; typical):
FM mode (measured at 12 dB SINAD)

| | |
|---|---|
| 1.625 - 5.0000 MHz | 0.56 µV |
| 5.000 - 29.995 MHz | 0.25 µV |
| 30 - 117.995 MHz | 0.20 µV |
| 118 - 174.995 MHz | 0.18 µV |
| 175 - 329.995 MHz | 0.22 µV |
| 330 - 429.995 MHz | 0.25 µV |
| 430 - 449.995 MHz | 0.22 µV |
| 450 - 469.995 MHz | 0.25 µV |
| 470 - 999.995 MHz | 0.28 µV |
| 1000 - 1309.995 MHz | 0.35 µV |

WFM mode (measured at 12 dB SINAD)

| | |
|---|---|
| 76 - 108 MHz | 0.78 µV |
| 175 - 221.995 MHz | 1.78 µV |
| 470 - 770 MHz | 2.50 µV |

AM mode (measured at 12 dB SINAD)

| | |
|---|---|
| 0.495 - 4.995 MHz | 2.50 µV |
| 5.000 - 29.995 MHz | 1.78 µV |
| 118 - 136 MHz | 1.78 µV |
| 222 - 246.995 MHz | 1.78 µV |
| 247 - 329.995 MHz | 1.78 µV |

Selectivity: AM, FM – More than 12 kHz/-9 dB, Less than 30 kHz/60 dB,
and WFM – more than 150 kHz/-6 dB
Audio Output Power: 75 mW typical, at 10% distortion with an 8 ohm load.
External Speaker Connector: 3-conductor 3.5(d) mm (1/8")/8 ohms

*These specifications are subject to change without notice.*

## THE WORLD IS WAITING FOR YOUR WORDS OF WISDOM

Well, maybe not, but it was good alliteration!

Still, if you know your radio, there could be some money and a free subscription in it for you. If you think you have some words of wisdom to pass along about scanning, SWLing, utilities, using your equipment, new technology, etc, let us know!

Write Rachel Baughn, Editor, editor@monitoringtimes.com and make your best pitch! For more information see w*ww.monitoringtimes.com/html/writers_guidelines.html*

MT REVIEW

# Tivoli Audio's NetWorks Global Radio

By John Figliozzi

While terrestrial and satellite digital radio have been struggling to either gain traction with consumers or establish a sustainable business plan, wifi internet radio is becoming an accepted digital transmission platform for radio in North America.

The emergence of a range of appliances with wifi radio capability at wider price points signals that a viable market for wifi internet radio is developing. During recent strolls through mass market stores like Best Buy and J&R, I have even started to see a few such radios displayed on their shelves.

One prominent and promising example of this trend is the new NetWorks Global Radio from Tivoli Audio. Having built its reputation as a purveyor of high quality, simple, but elegantly designed AM/FM table radios with a somewhat retro touch, Tivoli has decided to make a strong initial move into the internet radio sector.

Initial experience with NetWorks shows that it hits most of the high notes claimed. Furthermore, NetWorks' ability to activate feature and functionality improvements by regular firmware updates gives promise of the designer's clear intent to provide long term value.

## ❖ The Package

Included with the radio itself is a 9 foot (2.74 meter) power cord (the transformer itself is contained within the radio, a good feature), a remote control with battery installed, a 22 inch (55.2 cm) long USB accessory cable, operations manual and warranty card.

NetWorks is housed in a natural hardwood enclosure – available in cherry, walnut, or

wenge (a dark brown wood) veneers – measuring in inches 8.74Hx5.51Wx5.12D (in cm. 22.2x14x13) and weighing a solid 4 lbs. (1.8 kg). In keeping with the character of the Tivoli line, the face of the NetWorks has simply a display screen and a speaker.

The display is somewhat larger than most in this genre, which allows for a welcome four lines of information in white print on a blue background. This is an attractive pairing, offering good readability with brightness and contrast levels that automatically adjust to ambient light. When the radio is off, there are options to display time in a digital or analog format. If the display is deemed too bright for the bedside, it can be turned off entirely, with an ability to activate briefly by pressing the one inch round button on the center top of the box (or any button on the remote or at the back of the unit, for that matter).

When the radio is on, the first line of the display shows alternatively the name of the radio (which seems redundant given that it is permanently affixed to its face) and the web address of the NetWorks portal. (More on that later.) The second line shows the name of the station or stream being played.

The third line initially reads out the word "Playing," but through progressive clicks of the select button on the remote or back of the box it will show additional information, such as the type and speed of the stream and a more detailed description of the station or program. The fourth line is reserved for corner symbols indicating "S" (stereo) or "M" (monaural) and the strength of the wifi signal being received, with the time in digital format in-between.

The speaker cover is attractively prominent in gold, behind which is a robust 3.5 inch driver which delivers far more audio punch and clarity – with loftier highs and deeper lows – than any other wifi radio currently on the market.

## ❖ The Controls

NetWorks seems designed to be controlled primarily and optimally through its remote. Doing so manually is made cumbersome by placement of nearly all of the controls at the rear of the box. It would take almost incredible powers of memorization and tactile acuity to hit the correct buttons on the back while watching the screen in the front for response. Clearly, the designers intend the manual controls to be used sparingly, if at all. Therefore, one needs to take particular care not to misplace the credit card sized remote.

The round button on top of the radio controls on/off by pressing it on its center and volume by rotating it clockwise and counter-clockwise. A quick tap on center will mute the audio and then reactivate it. When the radio is in alarm mode, pressing the button will grant seven minutes to snooze.

Apart from mirroring the controls on the remote, other features on the back of the unit include a mono/stereo switch (for when a second speaker or headphone is used for stereo reproduction), a balance control, a 3.5 mm headphone port, a USB port.

However, the remote gives the user the most efficient means of navigating to and through the various menus, station, stream and musical selection lists, raising or lowering the volume, programming and selecting the five preset buttons, and turning NetWorks on and off. In that sense, NetWorks is easy and intuitive to operate, despite the rather quirky design of the controls on the unit itself.

## ❖ The Connections

The NetWorks Global Radio, like all other radios in this genre, requires access to


***Connections are found on the bottom of this unit instead of on the back for a neater look.***

broadband internet. While many similar products only work with a wireless connection, NetWorks offers a choice between wireless and wired.

This Ethernet port is located on the recessed bottom face of the unit, along with a number of useful connection options. As with the controls placed on the rear of the unit, this is a unique arrangement that can create some problems, regardless of cosmetic considerations, if the space reserved in the design is not deep enough to clear the various plugs that could be connected to the unit. However, in most cases it appears that cords are malleable enough to allow bending so that the unit will still rest flat.

In addition to the power cord input, a 12V DC input is provided for an optional power supply when the unit is used on a boat or camper. There are also auxiliary in, mix in, and record out ports, as well as subwoofer and right speaker out ports (for connection of a Tivoli second speaker and subwoofer available at additional cost).

## ❖ Performance Overall

NetWorks operates in three modes: internet radio, music player, and auxiliary. In internet radio mode, the unit plays the streams of online radio stations and podcasts, notably including *BBC Listen Again* content which makes many BBC radio programs available on demand for seven days after first airing.

In music player mode, once properly set up and configured by the user, NetWorks plays music stored on your Mac or PC, except DRM-protected music. Music player mode also allows for playback of any content stored on a USB connected device.

In auxiliary mode, NetWorks can be used to play content from any other external audio source.

Without going into a great detail, connecting the NetWorks unit with a wireless (or wired) broadband network is direct, smooth and relatively quick. The process is not remarkably different from what has become characteristic of the genre. However, once initially configured, it is considerably faster from "switch on" to "play," and this is a welcome improvement over much of the competition, some of which can take upwards of a full minute or more to complete the start-up process. When this happens every time the radio is turned on, it quickly becomes tedious. Notably, NetWorks gets this right – the listener is greeted with his selection quickly and efficiently with only a few seconds' delay while content necessarily buffers.

As soon as it starts playing, NetWorks' superior audio performance is immediately apparent. Its room filling sound possesses the clarity and depth that make it almost a musical instrument in itself. And even if you are particularly finicky about sound quality and don't initially find the audio performance fully appealing, there are controls you can activate through the menus to set and store your own equalization preferences and get it right for you.

NetWorks Global Radio
Tivoli Audio, LLC.
Seaport Center
70 Fargo Street
Suite 901
Boston, MA 02210
USA
$599.99
$649.99 (with FM)
$749.99 (with FM and matching additional speaker)
www.tivoliaudio.com

## ❖ As an Internet Radio Receiver

How well this genre of receiver functions is dependent, not only on the design of each radio itself and the strength of its connection to your home broadband network, but also on the radio's link to a web portal that provides both content and a degree of user control over that content. The quality of both the NetWorks' design and manufacture is nothing less than stellar and clearly apparent whether observing, handling, or listening to it.

In operation, the NetWorks maintains a solid connection to the home wireless network but the distance over which it can maintain that connection is partly determined by the user's wireless modem. My experience in a medium-sized home indicated that its ability is at least better than average.

The NetWorks also exhibits a superior ability to handle streams that might otherwise prove problematical. This is in part due to a unique, proprietary feature that allows the user to selectively engage a "Superbuffer" that stores a larger swath of content to guard even further against loss of program continuity.

Tivoli's proprietary web portal, found at **www.tivoli-portal.com**, seems a bit more of a work in progress. In a realm where there are upwards of 20,000 stations and podcasts, it may seem overly critical to point out that the NetWorks portal has on hand several fewer thousand sources (at this writing) than, for example, the **reciva.com** portal that services radios using its chipset. After all, as with other such portals, Tivoli does have a facility that allows users to request that sources not already listed be added to the overall list or to only that user's radio. Also, a tour through what's already on the list shows that most established and recognized streams are indeed there, as are popular features like *BBC Listen Again* and podcasts from dozens of major providers.

Nonetheless, some consumers may want the largest ready list possible, making this feature a factor in their purchase of a radio. Having a team monitor all such streams and maintain it on a daily basis is admittedly costly, but of considerable value to the user. With a radio at this price point, it is not unreasonable to expect more.

Furthermore, unlike some other portals, the Tivoli system is not automatic or instantaneous. From reading through the support messages on the site, it can sometimes take several days for Tivoli personnel to manually implement a user request. This may make some sense as a means of ensuring quality control, but it is not user friendly and needs to be improved. For example, the Com One Phoenix (which I reviewed previously) has an automated system that immediately tests the requested stream for compatibility with the Phoenix firmware and adds it to the user's source list instantaneously if it's compatible. If the bargain-priced Phoenix can offer this convenience, Tivoli should be able to do the same.

However, maybe a more important factor for the user is the commitment level of the radio's maker to supporting both the product and the web portal. In these respects, Tivoli gets full marks, where many others – including the aforementioned Com One – fall short. It has identifiable, live personnel assigned to address in a timely manner users' questions or any issues that arise in their use of the NetWorks. Given the newness of this product and the genre generally, having such demonstrably active and attentive support is both comforting and encouraging.

A welcome, additional indication of the depth and degree of Tivoli's support for its NetWorks Global Radio is the fact that there have been significant updates made to its firmware already, adding features and improving its operation. These updates are incorporated into the user's radio effortlessly and seamlessly through the internet. All indications are that this will be a regular occurrence.

Thus, the currency of this radio will be retained for years to come, with the potential that any shortcomings identified now or new features developed in the future will be addressed by Tivoli. In this way, a purchaser's decision to, in effect, invest in this radio will have been vindicated over and over again.

## ❖ Summary

As product lines mature, grades from basic to luxury develop. The fact that this is happening in this genre bodes well for both its longevity and stature in a very competitive radio/audio marketplace. The NetWorks' $599.99 entry price point is higher relative to other wifi internet radios on the market, but this is not at all a negative. Its buyers will value it both as a superior performer and an elegant design piece.

In sum, the NetWorks Global Radio is a premium product that justifies its premium price and – with the stated determination of Tivoli Audio's founder Tom DeVesto to make and keep it the best wifi radio on the market – it will continue to do so for many years to come.

*John Catalano, PhD*
*johncatalano@monitoringtimes.com*

# Touchatag: RFID for Home Use

## ❖ CQ CQ CQ DE John's PC 13.56 MHz K

OK, so this time Catalano has gone completely around the bend! What is he trying to tell us here? "CQ" is the recognized radio abbreviation for "Seek You," or asking if any station hears the transmission. "DE" derived from the French for "from," identifies the sending station and their frequency. And finally, the "K" indicates that the transmitting station is now listening for replies.

So is Catalano trying to tell us that his PC is sending out a radio signal on 13.56 MHz and waiting for a reply?! In a word…yes, if you have a new product called Touchatag, a **R**adio **F**requency **Id**entification (RFID) device, now available for home use.

## ❖ What Exactly Is RFID?

RFID technology has its roots in a sixty-nine year old military application. During World War II, the skies were filled with aircraft from both sides. What was needed was an automatic method of identifying if an aircraft was friend or foe. To meet this requirement, the IFF system (identification friend or foe) was developed. This used a transponder in the aircraft. Upon receiving a radio signal from a coded ground transmitter, the aircraft then transmitted a "return." This return identified it as a "friendly." (I actually owned a military surplus APX-6 transponder, which I bought on New York City's famous radio row Canal Street in the early 1960s.)

If you monitor aircraft, you can still hear the use of the transponder system, now used for aircraft tracking. Have you heard an air traffic controller (ATC) tells a pilot to "squawk" a code? What he is requesting is that the pilot set his transponder to a specific four digit code and push the transmit button shooting a burst at 1030 MHz. The ATC radar screens now pin that code to a label on the radar signal for that specific aircraft. Those are RFID's roots. But how did it evolve into what we have today?

## ❖ Looking for an App

Twenty years ago, the semiconductor industry was going through one of its periodic down cycles. Business for "chips" was badly off and factories were being closed all over the world. This Bang or Bust five-year cycle is common in the semiconductor industry.

About this time, someone in marketing, at the then-giant Philips Semiconductor Company (Eindhoven, Netherlands) came up with an idea that would always keep the chip factories humming. The concept was for a *very* inexpensive chip that would be designed as a passive transponder. Since it was passive, it did not need a power source. Instead, it utilized interrogating radio energy from the transmitter to power itself.


*Figure 1 – The Touchatag Starter Kit Product*

The application was to have one of these chips on, or in, every manufactured product. It would act as a bar code, but had the major advantage of not having to be hand scanned. All that was needed to read a room full of these chips attached to products, was the "correct" burst of radio transmission into the room. Then all of the products in the room would "reply" with their individual signals containing their specific information, e.g. model number, serial number, etc.

Philip management's eyes glazed over as they thought of the huge amounts of chips they could sell as a result of the project. Since it was not confined to one market, like PCs, the demand for these chips would be constant…and growing. No more down cycles!!

One major hurdle was the need for a very, very inexpensive chip. The problems were both technical and financial. Could a chip be made to perform all these functions and still be small enough to be cost effective?

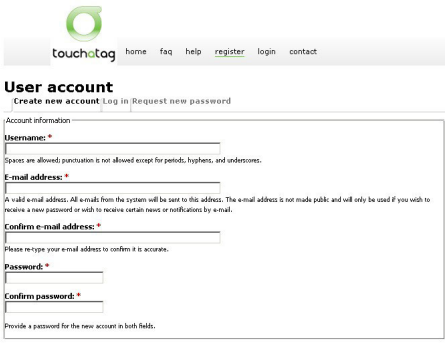



*Figure 2 – Rquired Registration Process*

The major cost of a chip is directly related to its production quantities. Could a ready-market be found who would gamble on introducing this inventory system on a very, very, very large scale? If both of these conditions were not met, the performance-cost goals could not be achieved. Without the high volume sales driving mass production, the low cost requirement could not be met.

For more than a decade, it seemed that this "chicken-or-the-egg" problem could not be solved, and the RFID chip remained an R&D program in many semiconductor companies.

## ❖ New Processing

Over the years, smaller and smaller chip structures have been developed as a result of advances in processing technologies. Another parameter that has changed is the market. Today, a tremendously huge and still expanding world consumer market exists as a result of developing countries.

The big break for RFID came a few years ago when the international giant retailer WalMart required all of their suppliers to provide RFID chips, or tags, on the shipping box coming from the factories. These RFID tags provide critical tracking and inventory data. Although, currently, WalMart does not require all individual products to be RFID tagged, that day may not be too far away.

## ❖ RFID System Overview

The passive RFID tag system is quite simple. It consists of a "reader" and an RFID chip, or tag, attached to the item of interest. The reader is actually a transceiver that transmits an interrogation signal. It then "listens" for any replies. If it hears a reply, it decodes the information, thus identifying the tag or tags.

As in any radio link, the range of operation is primarily a function of the transmitter power level and frequency. In fact, two types of RFID systems exist. The WalMarts of the world use a system based on UHF (860 to 950, and 2.45 GHz) that can detect RFID tags up to 100 feet away. On the other end of the "spectrum" is the Near Field Communication (NFC) RFID system that operates at 125 kHz and 13.56 MHz. Depending on their power levels, these NFC systems are designed to detect tags up to six inches away; not exactly DX!

The Touchatag product utilizes NFC and operates on a frequency 13.56 MHz.

## For Openers

Touchatag's starter kit product, Figure 1, consists of small reader box (4"x 2.6"x 0.5"), which is connected to the PC via a USB port. A round, adhesive-backed label-looking passive RFID tag (2.25 inches in diameter) completes the system. Ten are included in this kit.

The system requires a PC running Windows XP or Vista. For Apple lovers, it will ONLY work on an Intel MAC running OSX 10.4 or later. In either case, an Internet connection is required. We used Touchatag on our Radio Friendly PC (RFPC) which has a Atom 230 1.60 GHz processor running Windows XP Home Edition SP3, with a bus speed of 533 MHz, 160G SATA hard drive, 2 Gig DDR2 RAM, DVD/CD writable drive, Realtek ALC662 audio sound ports and a video port using the Intel Graphics Media Accelerator 950. A USB Wireless product was used to connect to a "G" system wireless router. RFPC is available at **http://HCSS.webs.com/**.

The Touchatag software, downloadable at **www.touchatag.com,** must be installed BEFORE the reader is connected to the USB port.

## A Strange Arrangement

While you are at their website, I suggest you register. As shown in Figure 2, a User ID and Password must be chosen. To complete the process you must respond to a verification email that will be sent to you automatically. It's free, but it's a requirement for the system to operate.

Yes, a requirement! And that's not all: Since both the Touchatag reader and RFID tags are located at the user's PC site, you would think that would be all that is needed. Not so. In order for the reader to operate, the user must have a live Internet connection to the Touchatag website and be logged into a registered account. OK, let's overlook this "procedure" for a minute and see how the system functions.

## What Can It Do?

If you are conversant in Java and Apache Maven, you can develop your own custom applications. See **http://developer.touchatag.com/documentation/java.sample.TouchatagClient.html** for details. However, if you are not a software developer, then you are relegated to using previously created applications (apps) found on the website. It would be more correct to call these templates, since the user can only "fill in the boxes." No action modifications or additions are possible.

Although there are currently eleven pages of apps (templates), they all seem to be divided into only two types. One type directs the PC to a location, either on the Internet or within a running program. The second type enters a user-defined script into a form's entry box. Both are pretty limiting. We'll try using a web link template.

## Getting Started

The User ID and Password, which we previously registered on the website, must be entered into the Touchatag program's Option menu. Now the program will connect to the website and open our user account. The program's tag icon will turn green once it has successfully connected to the website.


*Figure 3 – Second step of making an app*

Using our web browser, we go to the website and select "Dashboard" from the top menu. When we click the "Make a New Application" button we are presented with the current list of apps/templates. In Figure 3 you can see that we have chosen the "Web Link" application and have customized it by filling in the three boxes.

A summary of my customization of this app can be seen in the description box, "Shamelessly takes the web browser to the most innovative column in *Monitoring Times, Computers and Radio*." My target site's address is then entered in the URL box.

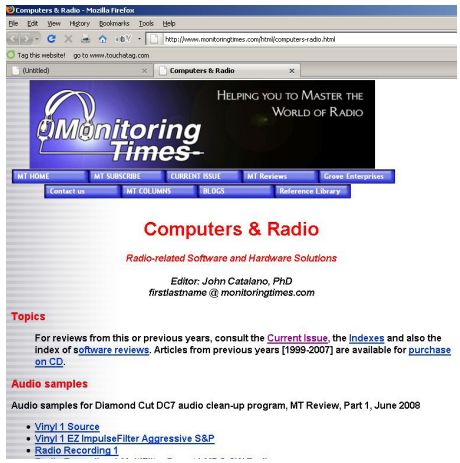



*Figure 4 - The result of touching the tag .. Ah, beautiful!*

## Tag Programming

The program then instructs the user to place a tag on the reader. Once the reader senses the tag (from its signal return), it reads the tag's pre-programmed and fixed serial number. In the final step, the program associates this specific tag with our chosen application. Now, no matter what the PC is doing, when the reader senses this specific tag, the browser opens the *Computers & Radio* page on the *MT* website.

## Does It Work?

Yes! Put the tag within 1.5 inches of the reader and BAM! Figure 4 shows the results. The speed at which Touchatag reads and then performs the application was a surprise. It all happens very fast.

Tag functions can be re-programmed or edited using a similar procedure. Thank goodness, since the tags cost about a dollar each. Ten are included with the basic kit. I warned you that getting to low cost requires huge mass production. That means buys of 10 million tags, not ten.

## Dream on, John!

I don't know about you, but I like to use specific radios with specific control, decode and logging programs. In some cases, I use multiple radios with one program.

Wouldn't be great if we could put a tag on each one of our radios? Then, when we "scanned" the tag on the radio we desired to use, the associated program would be opened. To round things off, the radio's specific details would be entered into the logging/control program's configuration menu... all automatically.

## Logical Comparison

However, since the maximum sensing distance of Touchatag is less than two inches, it begs comparison to a bar code. This comparison was not lost on the Touchatag people. During the tag programming procedure, the user is asked if a tag or printable two-dimensional barcode will be the sensing element. That's interesting.

Since the RFID reader has no moving parts, it is much less complex than an optical bar code reader. But (and it's a big but) the bar code "tag" can be created on most home printers and costs next to nothing, just the cost of some ink. That's a tough economical act to follow.

So, for what applications does the short range NFC RFID really shine? From the current limited number of really varied applications on the Touchatag website, it is still a technology looking for a home. The Touchatag starter kit, including a reader and ten tags, is available at **www.touchatag.com** for $39.95. Check out their website. And if you have a super hot idea for the use of Touchatag (the legendary Killer App), I'm sure they would love to hear about it. Tell them you saw it here.

## My 100 Cents (Inflation)

In my opinion Touchatag is a very innovative product with potential. It's actually fun to use. Seeing the almost-instant effect of a tag on the PC screen is mesmerizing. But I think it needs three critically important improvements: The first, and most important, is a far simpler "language" that allows the creation of new, complex, and really personalized applications, not just simple templates. Today, making truly new Touchatag apps is limited to programmers.

Second, the requirement for an Internet connection to the Touchatag website should be cut. Why can't it be a standalone product? And finally, the original problem: cost. One dollar (100 cents) per tag is just too high. Umm, it seems like we've been here before. Till next time … CQ CQ CQ DE John's PC 13.56 MHz K

# What's NEW

**Tell them you saw it in Monitoring Times**

## New Stuff – New Look

If you haven't visited the Grove Enterprises website (**www.grove-ent.com**) lately, you might want to point your browser to the URL above for a real treat. In addition to a more modern look, Grove has added *dozens* of new products.

Some of the product categories that radio hobbyists will be interested in include: shortwave receivers (Eton, Grundig, Icom, Kaito, Microtelecom, Sangean, and WinRadio); wide frequency receivers (AOR, Icom, and Winradio); handheld scanners (AOR, Alinco, GRE, Icom, Ramsey, Uniden and Yaesu); desktop/mobile scanners (GRE, Uniden, and WinRadio); and WiFi receivers (Grace and Sangean).


Receiving accessories can really add to the listening experience, and Grove has a good selection of amplifiers, battery packs, headphones, intermod and trap filters, noise cancellers, preamplifiers, preselectors, speakers, spectrum displays, and tuners from noted manufacturers such as ACL, Alinco, AOR, Atten Instruments, C. Crane, GAP, GRE, Heil, Icom, MFJ, PAR, Ramsey, Timewave, Uniden, Valor, WinRadio, and Yaesu.

Grove now carries a new line of products (transceivers and two-way radios). If you are looking for an amateur radio HF/VHF/UHF rig, Grove has all of the Alinco radios for you to consider. If you want to jump on the ham digital revolution, you can now purchase the AOR ARD9000MK2 digital voice modem from the website. The company also has license free radios (FRS/MURS/CB) and marine radios from Uniden.

You will also find a wide selection of shortwave/longwave antennas, VHF/UHF antennas, wide-frequency coverage antennas, radio direction finding antennas, coaxial cables, lightning arrestors, multicouplers, splitters, connectors, adapters, switches and mounts from Alinco, Antennacraft, AOR, Austin, Avcom, Create, Diamond, Grove, Grundig, Icom, LF Engineering, Max Systems, MFJ, Nil-Jon, PAR, ProComm, Select-A-Tenna, Stridsberg, and WinRadio.

A new area to explore on the website is Grove's "test and security equipment" section. Here you will find Avcom spectrum analyzers; a frequency counter from MFJ (see this month's *On the Bench*); an Alinco DC power supply; a multimeter from Mastech; radio/electric field detectors from ZAP and WinRadio; a Hadrian RJ-P9700 Cellular Phone Jammer; and the AOR AR-STV.

Quality and accurate radio reference material is an important part of being successful in the radio hobby, and Grove carries the best scanner control software from Scancat; digital decoder software/plug-ins from Radiocom, Wavecom and WinRadio; reference publications from Grove Enterprises, International Broadcasting Services, Ltd. (PWBR), Klingenfuss, Monitoring Times, Mr. Scanner, Radio Reference, Teak Publishing, Winradio and WRTH Publications.

You can browse and order all of your radio hobby equipment and accessories on the Grove website directly from their online catalog using their secure order system – 24/7. Add in Bob's Bargain Bin of used equipment and all of the free technical information, and you have the makings of one great website. So, why don't you drop by and pay them a visit and tell them that *MT*'s *Whats New* sent you?!

Of course, all these new catalog items may be ordered by phone or by mail as well. Call 1-800-438-8155 or 828-837-9200 to learn how.

## Yes, Monitoring Times *does have a website!*

I recently got an email from an *MT* reader asking if this magazine has a website? You bet we do. Maintained by *MT*'s Managing Editor, Rachel Baughn, the *Monitoring Times* magazine website is a wealth of radio frequency and information that you won't find anyplace else.

In addition to our staff and columnist contact information (including addresses to their online presence), you will find an electronic sample copy of *MT*, the link to our exclusive Readers Only website, the *MT* Reference Library, index to articles back to 1994, online reviews, selected articles from *MT* (e.g. the *NASA and Space Communications* handout and current *MT Airshow Guide*), late-breaking information and much more.

So, if you would like to extend your *MT* readers experience into new areas, free stuff, and more, jump on the net and check out the *Monitoring Times* magazine website at **www.monitoringtimes.com/**.

## Ten Tec 715 RF Speech Processor

The new Ten Tec Model 715 is a true RF speech processor that can be used with virtually any HF transceiver to increase SSB average output power by up to 6 dB. Increased average SSB power output means increased readability on the other side of your QSO. It's like turning on a linear amplifier – without the amplifier.

Model 715 RF Speech Processor is a high performance, true RF-type speech processor designed to operate with most modern HF Amateur Radio transceivers. RF speech processing is a superior system to the traditional AF clipping, AF compression, or RF compression found in a typical HF transceiver for achieving the highest ratio of average-to-peak power from an SSB transmitter.

- Increase average SSB power output by up to 6 dB
- Enhance readability by stations hearing your signal
- Break pileups for DXpeditions faster
- Keep your net or contest run frequency clearer
- Easy to install, easy to operate

The purpose of an RF speech processor is to increase the readability of your signal at the other end of a QSO. Speech processors do not increase peak power; they increase average power output. An up to 6 dB increase in average power output in SSB service can be achieved with the proper use of a true RF speech processor like Ten-Tec model 715.


This power increase, coupled with the ability to tailor the speech passband, can mean the difference between a signal buried under band noise or an intelligible, copyable signal.

The 715 RF speech processor is installed between the microphone and the microphone jack on your transceiver. Two inputs for microphones are provided. A conventional 8 pin microphone connector that is wired the same as the 8 pin microphone input on the Omni-VII and Orion II transceivers (also wired the same as 8 pin Yaesu connectors), and a second 1/8" input used for direct connection of microphones or headsets like Heil Sound, etc. The output connector is a 1/4" stereo connector. Output cables are available for 4 pin Ten-Tec, 8 pin Ten-Tec (also used by Yaesu), 8 pin Kenwood (also used by Elecraft), and 8 pin Icom.

The model 715 RF Speech Processor is priced at $249 plus shipping and is available from amateur radio stores nationwide. The price includes one output cable of your choice (see above). Additional output cables are available at only $35 each.

For more information call Ten Tec radio sales at (800) 833-7373 or email **sales@tentec.com**. You can visit their website at **www.tentec.com**.

Books and equipment for announcement or review should be sent to What's New, c/o Monitoring Times, 7540 Highway 64 West, Brasstown, NC 28902. Press releases may be faxed to 828-837-2216 or emailed to Larry Van Horn, larryvanhorn@monitoringtimes.com

# AOR introduces the AR-Mini

# Big Features! Small Size!

## This pocket-size communications receiver delivers BIG performance!

Actual size

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*Whether you use it for work or pleasure, you can take the AR-Mini with you to listen to public safety communications, airline traffic, marine communications, weather channels, trackside communications at car and motorcycle races, radio and television reporters in the field, shortwave communications from around the world, amateur radio frequencies, AM and FM radio signals, analog TV audio and more.*

*Powered by two AA Ni-MH cells (1.2v), the AR-Mini operates for approximately 22 hours on a single battery charge but it can also be used with AA alkaline batteries or with an optional DC cigar-lighter adapter.*

### AR-Mini Features include:

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- Automatic or selectable tuning steps
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- 2 VFOs
- Memory channel skip
- Battery save function with auto power off timer
- Free downloadable memory management software
- Preprogrammed "bug" detector frequencies with level beep to find hidden transceivers
- Small size: 2.4" x 3.7" x 0.9" (without projections)
- Weighs only 7.4 oz with antenna and batteries
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- Low battery indicator
- SMA antenna connector

***The AR-Mini is now available at your favorite AOR dealer!***

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Ads for Stock Exchange must be received 45 days prior to publication date. All ads must be paid in advance to Monitoring Times.
Ad copy must be typed for legibility.

### 1-3/4" SQUARE DISPLAY AD:

$50 per issue if camera-ready copy or, $85 if copy to be typeset. Photo-reduction $5 additional charge. For more information on commercial ads, contact Beth Leinbach, 828-389-4007.

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## MT BLOGS

Blogs offer an opportunity for columnists to share information that does not make their columns. The news might be too timely for deadline, too short, confined to a small geographical area, too far away to be heard in North America, or even off the columnist's regular "beat." Bookmark these blogs for frequent visits!

MT: AMERICAN BANDSCAN
**http://americanbandscan.blogspot.com/** - by Doug Smith

MT: FED FILES
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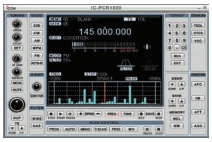

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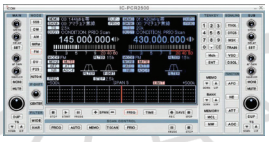

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